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MEDICINE AND THE MEDICAL AGE

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Practical Therapeutics

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ORIGINAL COMMUNICATIONS.

SOME PRACTICAL POINTS ON THE TREATMENT OF ECLAMPSIA, WITH REPORT OF ILLUSTRATIVE CASES.[1]

BY J. O. ARNOLD, M.D.,

Associate Professor of Obstetrics, Temple University Medical School; Assistant Obstetrician to Samaritan Hospital.

The cause and prevention and treatment of eclampsia are among the oldest and most extensively discussed themes in the practice of medicine. Hundreds of investigators in all parts of the world have for years been working ceaselessly on these questions, with but comparatively little practical result. In fact, the whole subject of the toxemia of pregnancy, in spite of all that has been done, remains to-day the greatest unsolved problem in the obstetric world. When the time comes, as I believe it will come sooner or later, that the origin and specific rational treatment of this great scourge of maternity are definitely known, medical science will have conferred on womankind the greatest boon since the days of Semmelweis and Holmes. This peculiar and all-prevailing maternal toxemia may not cause as many deaths as sepsis, or as much mental and physical anguish as dystocia, or even as long a train of morbid sequelæ as labor traumatism, but all of these are largely, if not wholly, preventable. Their causes are known, and they only continue to exist because we permit them to, but the toxemia of pregnancy still spreads its terrors in all its varied forms, without our being able rationally and consistently to raise so much as a finger in its prevention.

But to come back to the subject of treatment. I find at the conclusion of my notes on eclampsia, written some two years or more ago, in the maternities of Vienna, Dublin, Glasgow, Edinburgh, and London, this brief summary of the impressions made upon me at that time: "A judicious combining of the Stroganoff or 'conservative' methods, with some of the best of the more radical measures, is, in my opinion, productive of better results in most cases than the attempt to follow either school alone." This was the way I felt about it then, and after two years of experience in the practical application of that idea I am more than ever convinced that the impressions then recorded were correct. That I may help you to weigh this matter for yourselves, I shall briefly outline the two methods, and then give you some case reports to show the results of a plan of treatment that includes something of both.

The methods of the so-called Continental or "conservative" school may be summarized about as follows: "No matter what causes eclampsia, it is the convulsions that kill, or do the serious damage. If they can be prevented, or quieted, nature will cure the eclampsia, or whatever produces it." This is the central idea of the Stroganoff treatment. The immediate or precipitating cause of the convulsions is some local or transient excitant. Therefore, the first object in treatment is to remove, so far as possible, every peripheral or other excitant. If the patient is in a convulsion when first seen, give her at once at least a half-grain of morphine hypodermically. If she is not in a convulsion, but has been or appears

[1] Read at a meeting of the North Branch, Philadelphia County Medical Society, Feb. 28, 1916.

to be on the verge of a seizure, then chloroform is given in the smallest possible quantity that will enable one to give, without disturbance, the first hypo of morphine, to make any examination necessary, or to do venesection if that is immediately urgent. The next step is to darken the room and secure absolute quiet, for even light and noise may excite convulsions. In about one hour 30 to 40 grains of chloral hydrate is given by the bowel. In another hour (or two hours from the first dose) the second hypo of morphine is given. Alternate doses of chloral and morphine are then kept up at such intervals and in such amounts as appear necessary to control the convulsions and quiet the patient. If in spite of this treatment convulsions continue (which they will in a certain small percentage of cases), then the uterus must be emptied.

If the convulsions are thus controlled, which it is claimed they are in a large majority of the cases, then the pregnancy is not interrupted, but allowed to go on a month, more or less, as the case may be, to delivery at term.

It will be noted that this programme leaves no place for the stomach pump, for active purgation, or for hot packs, or other methods of sweating. The only immediate means of elimination is by venesection, which is done freely, and until effective on the blood-pressure. Sweating might not be inconsistent with this programme of quiet and non-interference, but it is absolutely contraindicated, according to this school, on the ground that the toxins are already in too concentrated a form, and that sweating increases this concentration, by removing much water from the tissues, with but a negligible quantity of the toxins.

Washing out the stomach cannot be successfully accomplished, it is claimed, without greatly disturbing the patient at a time when the whole aim is to prevent all disturbances. Purging could only remove the gastrointestinal toxins and not the specific toxins of pregnancy, and would also deplete and weaken and disturb the patient, when absolute quiet is the thing sought for. Likewise any attempt to induce labor, to dilate the os, to apply forceps, or to interfere in any way with the natural process of emptying the uterus, would, according to the Stroganoff idea, be prohibited on the ground of its being a violent excitant, liable to cause convulsions, and to shock and weaken the patient.

So much for the conservative side.

In the English maternities, and very largely in American institutions, there are those who wholly or in part reject the Stroganoff methods, and maintain that since we have no rational treatment for eclampsia there is but one thing to do, and that is to terminate pregnancy as quickly as possible, and thus remove the direct or indirect source of the toxins that cause the convulsions. Accouchement forcé, therefore, including vaginal or abdominal Cæsarian section, or if not so urgent as this, some of the slower methods of opening the uterus, along with the most vigorous methods of elimination by bowel, skin, and kidneys, practically sums up the radical treatment.

I found as I traveled about that the degree of radicalism, as well as the methods of securing elimination, and of temporarily controlling the convulsions, varied greatly with men and places. For instance, Monro Kerr of Glasgow was a rather ardent advocate of accouchement forcé, and the eclampsia mortality in Glasgow maternity was very high, 30 per cent or more. Ballantyne and Nicholson of Edinburgh were enthusiastic on almost every other radical measure except the forcible emptying of the uterus, and their results were fairly good. They used hot packs, gastric lavage with huge doses of salts left in the stomach, and venesection with calcium chloride gr. x to the pint, intravenously, to take the place of the blood withdrawn.

Morrison from one of the English colonial hospitals has just reported 236 cases treated chiefly by morphine, and sodium chloride and sodium acetate 3j of each to the pint, substituted for blood withdrawn by venesection.

Tweedy and Jellett, of the Dublin Rotunda, compromised with their more radical English and Scotch brethren by letting the

pregnancy alone and using morphine freely, washing out the stomach and introducing purgatives, and giving alkaline fluids subcutaneously. At the same time they strenuously avoided chloroform, hot packs, bloodletting, and all drugs or foods by mouth, and their mortality was the lowest on record outside of the Stroganoff clinics.

So much in brief for these two schools. In the absence of any scientific or rational treatment, which of course must await the discovery of the cause, the value of these various palliative and empiric measures must appeal to us in accordance with the degree of success attending their use. When any method of treating eclampsia brings the mortality down from 20 per cent or more to 8 per cent or less, as the Stroganoff treatment has done in several of the large European maternities, even to less than 6 per cent in the hands of Stroganoff himself, then it is our duty as obstetricians to give serious consideration to such a method, and so far as possible to adapt and adopt it in our practice, for no other treatment has ever given half as low a death-rate.

If morphine and venesection and the barring of all peripheral or other excitants, including gastric lavage, violent purging, sweating, and accouchement forcé, will greatly reduce both the maternal and fetal mortality in eclampsia (which it has done wherever systematically adopted), then I for one am going to try to follow close to this course of treatment. But if in addition to this I find that the consensus of opinion among the most successful English and American obstetricians is that the uterus should be emptied whenever one or more convulsions have occurred, then I believe I am justified in departing from the strict letter of the conservative treatment to the extent that will permit me in the majority of cases, after having controlled the convulsions, to terminate pregnancy, and to terminate it by whatever method promises least shock to the patient. And finally, if Martin H. Fischer, and Tweedy, and Ballantyne, and Morrison, and many others have conclusively shown that the replacing of toxic blood withdrawn by alkali-salt solutions has greatly favored kidney action and thereby hastened the recovery of the patient, then I feel that I had good grounds, some two years ago, for further modifying the Stroganoff method, by substituting for chloral hydrate the Fischer solution with bromides.

To sum up, then, I would say that what has appealed to me as the best general plan of treatment for eclampsia at the present time is about as follows:

1. Chloroform, if necessary, in the smallest possible quantity that will enable one to give the first dose of morphine without disturbing the patient.

2. This first dose of morphine to be at least half a grain, and to be repeated in two hours, or as soon and as often as is necessary to control the convulsions.

3. Bleeding by venipuncture or venesection as early in the attack as possible, and to the extent of from 12 to 24 ounces or more, according to the case and to the effect on blood-pressure, using the blood-pressure apparatus, preferably, for the tourniquet.

4. After cleansing the lower bowel, the giving by Murphy drip of sodium bromide ʒj or ʒij, and sodium carbonate ʒij or ʒiij to the quart of normal salt solution, as rapidly and as constantly as the bowel will take it. If the bowel should be intolerant of this solution, or if the case appears to need it, in addition to this fluid by bowel, bicarbonate of soda ʒij to the pint of normal saline is given by hypodermoclysis, as often as appears necessary.

5. In cases occurring before the eighth month, if there have been more than two or three convulsions, induce labor. After the eighth month, terminate pregnancy regardless of the number of convulsions, letting the circumstances and conditions determine whether the delivery shall be by the normal route following the induction of labor, or by the more rapid method of Cæsarian section.

6. No drugs or nourishment of any kind (with the possible exception of water) to be given by mouth until long after the convulsions have ceased, but a continuation of the alkali-salt solution by bowel until the quantity and quality of the urine are satisfactory.

I append brief case reports of the last 17 eclampsia patients coming under my care. I am well aware that so small a number of cases is of comparatively little use in pointing the value of any method of treatment. That, however, is not my sole purpose in reporting them. I feel that the series is of some interest in this connection, in that it comes as near to covering all types of the disease, and of the various complications that go with it, as one is likely to find in so small a number of cases. It also suggests how one's eclampsia mortality may be high or low from causes largely independent of any method of treatment.

The list is made up of 14 primiparæ and three multiparæ. There were five maternal deaths—four from attacks occurring in pregnancy, and one in labor. Of the 19 babies born, seven died. Two of the seven had not reached the age of viability; one died *in utero*, possibly from preëclamptic toxemia (No. 3); and four, all premature, died from the direct effects of the eclampsia or its treatment.

I have separated the list into four groups:

(A) Three cases of preëclamptic toxemia.

(B) Eight cases of antepartum eclampsia.

(B) Four cases of intrapartum eclampsia.

(C) Three cases of postpartum eclampsia (one of these appearing twice in the list).

It will be seen that the three cases in Group 1 were unquestionably on the verge of eclamptic seizures, and were all successfully treated by bloodletting and alkali-salt solution, with rest in bed and restricted diet. No. 1 illustrates the relative value of home and hospital treatment, in controlling such conditions. No. 2 appeared to show the efficacy of blood serum from a woman in labor as a means of inducing labor in another. No. 3 may be of interest to those who hold that the intrauterine death of the child lessens the toxemia. Of the four deaths in Group 2, only one (No. 8) resulted directly from the convulsions. No. 4 died of pneumonia several days after the convulsions ceased. No. 9 had but one kidney and a late infection, and No. 10 died of intestinal obstruction (ileocecal intussusception). Death in each instance, however, was indirectly due to eclampsia, and therefore every case must be counted in reckoning the mortality-rate. In Group 3, labor had begun in each case before the convulsions occurred, and excepting No. 13, each patient responded more or less promptly to treatment. No. 15 illustrates the mistake of depending upon the postpartum flow for bleeding. This was a strong, full-blooded girl, and should have been bled 25 or 30 ounces at once, regardless of delivery.

The three postpartum cases not only show considerable variation in the time of onset, but demonstrate the value of morphine and venesection at this time, as well as in the earlier cases.

While the mortality of this list is high, yet from the standpoint of the method of treatment here recommended it is not as bad as it would at first appear. In every case in which the treatment was carried out efficiently from the start, the results were good. Nos. 8 and 13 died practically without treatment. No. 13 is of special interest. Death followed two convulsions in rapid succession, which came at the end of an exhausting labor, wholly unheralded by any of the usual signs of toxemia. In fact it may be questioned whether such an attack is due to toxemia at all, or whether it may not be due to the severe strain of labor on an overwrought nervous system, and therefore another appeal for greater care in conserving the nerve energy of this type of patients in labor.

No. 8 is worth reporting to show the futility of that half-hearted, slow, and wholly inefficient method of treatment, which is still taught in some places, and still practiced by too many physicians. With a strong, plethoric, robust young woman, as in this case, suddenly overwhelmed with the peculiar poisons of pregnancy that have filled her blood to overflowing, to waste valuable time trying to control convulsions with small doses of morphine and veratrum viride, or other drugs, or trying to eliminate these poisons through the indirect route of the bowels, kidneys, and skin, is, in my opinion, as bad as no treatment at all.

I am morally sure that this patient was not different at the outset from several other cases in this series that yielded read-

ily to treatment, and I have every reason to believe that large doses of morphine and early and copious bleeding, with alkali-salt solution in the blood, would have saved this woman, as it saved the others.

It will be seen, therefore, that of the five fatal cases, not one died under the treatment here outlined, and that the other twelve patients all recovered under this treatment.

In conclusion I would like to emphasize these points:

1. That preëclamptic toxemia should be treated as promptly and as actively as eclampsia itself.

2. That morphine in sufficient quantity is the safest and most effective agent for temporarily controlling convulsions.

3. That venesection, early and freely, is the quickest and best means for securing elimination and reducing blood-pressure.

4. That the high degree of acidosis in eclampsia calls for alkali-salt solution to replace the toxic blood withdrawn.

5. That in practically all cases, after controlling the convulsions, the second step in treatment is to empty the uterus.

(A) PREËCLAMPTIC TOXEMIA.

(1) Mrs. C., I-para, aged twenty-six. Seen in consultation at end of seventh month. Blood-pressure 210. Scanty urine, loaded with albumin. Headache, visual disturbances, and general edema.

Diagnosis: Preëclamptic toxemia.

Treatment: Removal of patient to hospital, venipuncture, alkali-salt solution by bowel, milk and water only by mouth.

Immediate and rapid improvement. More than 100 ounces of urine in the second twenty-four hours. Fischer solution gradually discontinued. Patient went home in two weeks feeling quite well. At home, toxic symptoms soon returned, and labor was induced at end of eighth month.

Child born normally and in good condition. Eclampsia on third day, postpartum. (See No. 18.)

(2) Mrs. R., I-para, aged twenty-four. Eight months pregnant. Blood-pressure 180. Scanty urine loaded with albumin. Edema, dizziness, and visual disturbances.

Diagnosis: Preëclamptic toxemia.

Treatment: Removal to hospital, venipuncture, saline purges, and restricted diet. Two days showed much improvement, but blood-pressure still 150.

On third day patient was given experimentally 15 Cc. blood serum from a nontoxic woman in the beginning of labor. Without other apparent cause, labor began in five or six hours, and terminated normally about thirty hours later. Alkali-salt solution by bowel was continued for several days. Albuminuria gradually disappeared. Mother and child made good recovery.

(3) Mrs. B., I-para, aged twenty-three. Eight months pregnant. Blood-pressure 178. Persistent severe headache and visual disturbances. Very scant urine, almost solid with albumin. Muscular twitchings of face noted at times.

Diagnosis: Preëclamptic toxemia.

Treatment: Bloodletting, which immediately relieved the headache; saline purge, followed by alkali-salt solution by Murphy drip. Much improvement in two days. Sixty-four ounces of urine in twenty-four hours. No fetal heart sounds heard. Blood-pressure still above 150. Labor induced on third day. Still-born child. Threatened convulsions during labor were quieted by morphine. Rapid improvement followed delivery. Ten days later, blood-pressure and urine were normal.

(B) ANTEPARTUM ECLAMPSIA.

(4) Mrs. F., I-para, aged nineteen. Eight months pregnant. First seen in consultation after she had had ten convulsions. Patient unconscious, with convulsions recurring about every half-hour. Morphine given without much effect. Blood-pressure was reduced by venesection, and labor induced. Patient delivered of a dead child four hours later. Convulsions continued during labor, and for a time afterward—more than twenty in all. General condition of patient very bad. Response to alkali-salt solution poor. Some improvement in the next two days, followed by bronchial pneumonia and death one week later. No necropsy.

(5) Mrs. G., I-para, aged twenty-four. About 8½ months pregnant. Seen in consultation as she was emerging from her third convulsion. Gave at once morphine grain

½ and drew 20 ounces of blood. No recurrence of convulsions. Morphine repeated in one hour and alkali-salt solution given by Murphy drip. Patient improved rapidly, and three days later went into labor spontaneously and was successfully delivered of a living child. Mother and babe made good recovery.

(6) Mrs. F., I-para, aged twenty-two. About 8½ months pregnant. Seen in consultation after she had had two convulsions. Gave morphine and did venesection. No more convulsions. Diagnosis of twins. Labor induced by use of an "A" tube. Labor long and rather severe, but patient stood it well. Mother and babes made good recovery.

(7) Mrs. M., I-para, aged twenty-eight. Seven months pregnant. Seen in consultation a few hours before her eclamptic seizure. Blood-pressure 190. Severe headache and dimness of vision. Scanty urine, loaded with albumin. Patient taken at once to hospital, and 20 ounces of blood drawn. Alkali-salt and bromide solution started by bowel. The first convulsion occurred about an hour later. Half-grain doses of morphine were given as often as convulsions occurred, which was at three- to four-hour intervals. Induction of labor resulted in the birth of a dead child twelve hours later. Patient had five convulsions before emptying the uterus, and one five hours after. Improvement was rapid and recovery complete.

(8) Mrs. K., I-para, aged twenty-four; 8½ months pregnant. Seen in consultation after she had been in severe convulsions for ten hours. Convulsions were recurring every half-hour, and patient had been unconscious from time of first convulsion. She had been given small doses of morphine, chloroform, purgatives, pilocarpine, and hot packs. Her condition was extremely bad. No evidence of life in child. Rapid delivery by vaginal hysterotomy with craniotomy failed to give relief. Convulsions continued, and patient died from exhaustion shortly after delivery.

(9) Mrs. J., I-para, aged nineteen. Six months pregnant. Came under my care at the Samaritan Hospital, after three or four convulsions had occurred. Patient unconscious; convulsions unusually severe, and recurring at half-hour intervals. Morphine and bloodletting controlled the convulsions, after there had been six or seven in all. Labor was induced and a dead fetus expelled about six hours later. Much improvement in twenty-four hours, but only 3 or 4 ounces of urine. Patient regained consciousness, but was at times delirious. Alkali-salt solution and all other efforts failed to increase the quantity of urine. General edema became marked and delirium constant. On the third day patient began to have fever, which ranged from 101° to 104° for the next three days. Death occurred on the sixth day.

Necropsy revealed one functioning kidney, and one rudimentary kidney congenitally located in front of the body of the last lumbar vertebra. The pathologist also reported a general infection of the pelvic and abdominal viscera with the bacillus aerogenes capsulatus.

(10) Mrs. M., multipara, aged thirty-four. About 6½ months pregnant.

Admitted to the Samaritan Hospital in the service of Dr. J. C. Applegate, with whose permission I report the case. In Dr. Applegate's absence she came under my care, after she had had five convulsions. She had thus far failed to respond to treatment, and was in extremely bad condition. High-tension pulse, marked cyanosis, and beginning edema of the lungs. Morphine and venesection quickly relieved the respiratory distress, and she had but one more convulsion. Considerable improvement in the next twenty-four hours. At this time the uterus expelled a macerated fetus. There was also noted at this time marked distention of the abdomen, which grew gradually worse in the next two days and resisted all efforts to secure bowel action or give relief. The diagnosis of intestinal obstruction was not confirmed by a surgeon called in consultation. Death occurred one week from date of admission to hospital. Necropsy revealed a complete obstruction of the bowel from ileocecal intussusception.

(11) Mrs. C., VI-para, aged forty-two. About seven months pregnant. Had four

convulsions at home. Her physician gave morphine and did venipuncture, then sent her to the Samaritan Hospital. When seen in consultation, patient was very restless and still having convulsions at one-hour intervals. She was again bled and given larger doses of morphine. Only one convulsion after this. Induction of labor resulted in the expulsion of a dead child six hours later. Alkali-salt solution with bromides was given by Murphy drip. In twenty-four hours patient had cleared mentally and was in good condition. Complete and rapid recovery.

(c) INTRAPARTUM ECLAMPSIA.

(12) Mrs. E., I-para, aged twenty-three. At term. Labor had been in progress but an hour or two when patient had an eclamptic seizure. Saw her in consultation after her second convulsion. Examination revealed twin pregnancy, marked general edema, scanty urine loaded with albumin, but blood-pressure below 150. Letting 12 ounces of blood brought blood-pressure to normal. In the next twelve hours patient received two half-grain doses of morphine and two quarts of Fischer solution with bromides by bowel. In this time she had three convulsions at three-hour intervals, regaining consciousness after each fit. One breech presented and labor progressed slowly, but patient's condition improved rapidly, and labor ended in the birth of living children thirty-six hours later.

(13) Mrs. S., I-para, aged thirty-three. At term. Had been under my care for three months. Throughout pregnancy her general physical condition was poor. None of the usual evidences of toxemia, but a low vitality and unstable nervous equilibrium requiring almost constant medical attention. There was also a history of acute dilatation of the heart some years before. Labor began spontaneously, and progressed slowly but normally except for a severe pain on the top of the head, which grew less severe as the os became more fully dilated. After ten hours dilatation was complete, the head well engaged, and to conserve her failing strength I prepared to terminate labor with forceps. When just ready to apply the instruments the patient was unexpectedly seized with a most violent convulsion. A small quantity of chloroform was given as soon as possible, and I quickly delivered the child, alive and uninjured. A second convulsion immediately followed delivery, and the patient died within a few minutes from heart exhaustion.

(14) Mrs. M., I-para, aged twenty-two. At term. Symptoms of toxemia had been noted for about a week. Normal labor had continued six hours when patient had her first convulsion. Saw her in consultation immediately after this, and under morphine and light ether anesthesia terminated labor with forceps. A second convulsion occurred half an hour later. Morphine was again given and alkali-salt solution by bowel. Within an hour patient had her third and last convulsion. Mother and child made a good recovery.

(15) Miss S., I-para, aged twenty-one. At term. In labor several hours when convulsions began. Admitted to Samaritan Hospital, where she came under my care, in the absence of Dr. Applegate, with whose permission I report her case. Labor terminated normally shortly after her admission. Severe convulsions were occurring about every half-hour, and continued postpartum. Morphine was given and 15 ounces of blood taken by venesection immediately after delivery. Convulsions became less severe, but continued at long intervals for the next twenty-four hours. In this time alkali-salt solution with bromides was not well tolerated, but the bowels had been well moved by purgatives. On the third day convulsions returned in great severity and frequent intervals. She was given ¾-grain doses of morphine at one-hour intervals and was again bled about 20 ounces and given an equal amount of alkali-salt solution hypodermically. Only two convulsions after this—more than 20 in all. Mother and babe made good recovery.

(d) POSTPARTUM ECLAMPSIA.

(16) Mrs. H., I-para, aged twenty-three. At term. Marked toxic symptoms noted for one week prior to labor. Spontaneous labor resulted in the birth of a small but healthy child. About twenty-four hours

later she had her first convulsion. In the next two hours three more convulsions occurred. After consultation she was given morphine, and was bled till blood-pressure fell to near normal. No more convulsions. Alkali-salt solution by bowel was kept up until urine became normal. Patient made a rapid recovery.

(17) Mrs. M., multipara, aged thirty-six. Delivered in normal easy labor at term. A large, strong woman who had not appeared toxic before labor. Began to have convulsions eighteen hours after delivery. Saw her in consultation as she was coming out of her third attack. Did venesection, 20 ounces, and gave three half-grain doses of morphine. No recurrence of convulsions. Alkali-salt solution was given by bowel. Rapid and complete recovery.

(18) Same as Case 1. Mrs. C., I-para, aged twenty-six. Eight months pregnant. Labor induced on account of persistent toxemia. Convulsions on the third day postpartum—five in all. Convulsions controlled by morphine and venesection and alkali-salt solution. Complete recovery of mother and child.

4149 North Broad Street.

ANESTHESIA IN LABOR.[1]

BY WILLIAM R. NICHOLSON, A.B., M.D., PHILADELPHIA.

The better title to my contribution to this symposium would have been "Analgesia During Labor," since—and this I desire to make clear—I am only concerned with the conduct of normal deliveries by means of analgesia. This is the larger part of the question in any event, since the time is long past when fruitful debate could be had as to the necessity of anesthesia in the major obstetric operations.

However, it was not so long ago—about the middle of the last century—that there was a most acrimonious debate in progress in this city between two very prominent obstetricians relative to the use of anesthetics in labor, the one gentleman strongly advocating such use, while the other, on the grounds of morality and religion, denied the propriety of their administration. Since that time we have progressed, and the "newer obstetrics" of our day has devoted much attention to the lessening of the pains of parturition. To such an extent has our enthusiasm carried us that, in our attempts to minimize the suffering of parturition, we have at times taken unjustifiable chances with respect to the maternal life, the fetal life, or both.

Now while it goes without saying that it is the duty as well as the privilege of the physician to lessen pain wherever possible, it is nevertheless clear that in combating the one evil we must not create a greater. While all present-day obstetricians are enthusiastic advocates of anesthesia, it is well to preserve our sense of proportion in our attempt to determine the best method by asking a question before going further, namely: Is anesthesia really necessary in normal labor? The whole past history of the world proves that it is not, provided that the patient as well as the labor be normal, but, as Lusk said thirty years ago, it is to be remembered that the price of our increasing civilization is a decrease in the power of resistance, and that the necessity of guarding woman against excessive suffering is becoming more and more important. To put it in another way, I would estimate that probably 15 per cent of normal women in normal labor really need anesthesia from the medical standpoint in order to be able to accomplish their task satisfactorily—*i.e.*, not merely to accomplish delivery successfully, but to do so without evil after-effects. The remaining 85 per cent will be delivered as safely and as satisfactorily, as regards evil after-effects, without anesthesia as with it. Now this is important, since in our advocacy of anesthesia to combat a type of pain manifestly not beyond endurance, the obstetrician accepts more than the usual responsibility inherent in the choice of an anesthetic. If this statement is agreed to,

[1]Read as part of a symposium on "Newer Obstetrics" before the Philadelphia County Medical Society at its meeting in February, 1916.

and it is certainly self-evident, its remembrance will help in the elucidation of the problem before us, namely, the selection of an anesthetic for use in labor which is not only efficacious but also safe for mother and child.

There are four possible methods by which we may induce analgesia in labor: chloroform, ether, scopolamine with morphine, or some one of the derivatives of the latter, and finally nitrous oxide with oxygen or air.

Chloroform is the easiest of all anesthetics to administer, is always efficacious, and would be ideal except for the fact that its danger is so great that it should never be used even as an analgesic agent. I have in former years used it repeatedly, but the margin between the required and the toxic dose is too narrow for safety, it is eliminated slowly, and its secondary or late results are more serious than those of any other anesthetic agent. In general surgery it has an estimated death-rate of from 1 in 1000 to 1 in 3000.

Ether is the safest of all anesthetic agents. It has a death-rate of from 1 in 5000 to 1 in 10,000. Of course, both the death-rate given for ether and also for chloroform are based upon statistics obtained from those who are at least moderately skilful in the administration of these drugs. If all deaths for which either of these drugs were responsible in unskilful hands could be computed the story would be a very different one.

I take this opportunity to express my sincere appreciation of the work done by the Bureau of Medical Education and Licensure of Pennsylvania in compelling the employment of skilled anesthetists in hospitals. I am free to admit that real experience in the giving of anesthetics is impracticable during undergraduate days, but at least some attempt could be made to teach the dangers incident to anesthesia and the symptoms which show that the said dangers are imminent. We have as a profession been remiss in this matter; it has been largely corrected now by the action of the Bureau of Medical Education, but it would have been corrected long ago had the public been informed as to actual conditions.

The use of ether as an analgesic in labor has been quite satisfactory, and it will continue to be the method of choice by the large number of practitioners because of its cheapness and ease of administration.

SCOPOLAMINE-MORPHINE-NARCOPHEN-PANTOPON.

In considering this anesthetic there are two points which I wish to place clearly before you: first, that there is no possible doubt that it is perfectly feasible to completely anesthetize a patient by these drugs; and secondly, that when we speak of this method of obstetric analgesia we are considering an entity, namely, the Gauss or Freiburg procedure. I desire to emphasize that the Freiburg method is an entity, since more than one enthusiastic searcher after dollars rather than after scientific truth has exhibited a single dose of morphine with one or two doses of scopolamine, and then has laid down claim to being a follower of the Freiburg school. The whole technique must be carried out, namely, hospital care, quiet, darkened room, noiseless attendants, dark glasses, and ears stopped with cotton. Any other plan of exhibition is not fair to the originators of the method, to say nothing of the lay journals and the department stores, whose altruistic activities were so much in evidence a few months ago.

Now what do we know as to the efficacy of this method? First of all it is to be remembered that for complete or surgical anesthesia a combination of these drugs has been conclusively shown to be very dangerous, more so than chloroform. The general surgeons had proven this to their satisfaction, and most of them had ceased to use it before we embraced it. Leaving this aside, we can now speak with considerable knowledge as to its efficacy as an amnesic agent in labor, and I shall quote from Polak, he being one of the most careful investigators of the question from the scientific standpoint. He has studied four hundred cases of labor conducted by this method, and reports an entire absence of maternal and fetal mortality. He has seen no cases of postpartum hemorrhage, and asphyxia neonatorum was less than usual. In his

series were eleven cardiovascular patients, two cases of exophthalmic goitre, six cases of pulmonary tuberculosis, eight eclamptics, and twenty-two border-line cases of pelvic contraction, to whom he desired to give the full test of labor. He cannot therefore be charged with having arbitrarily selected his cases. He states that from 70 to 80 per cent of cases will experience amnesia, and that the first stage is always eased and shortened in primiparæ. Further, he finds that the cervix is promptly dilated, and claims among the greatest advantages of the method that its use affords time for the maternal forces to obtain complete cervical dilatation, thus allowing the head to be driven deep into the pelvis, even though there be some relative disproportion; as a practical proof of this he notes a great reduction of median forceps operations in his clinic. He concludes that it is especially applicable to the nervously unfit woman, that it diminishes the number of forceps operations, that it is valuable in border-line contraction cases, and finally that it is essentially a first-stage procedure and bears the same relation to the first as does chloroform, etc., to the second stage. This last conclusion contains the gist of the whole matter and will be referred to later.

Another investigator, however, tells a totally different story. Baer reports a series of sixty cases with no success in twenty-six cases, little success in seven cases, partial success in eight cases, fair success in five cases, good success in eight cases, and complete success in six cases. This series may be criticized because of its small size, since it is well known that to have success in this method the operator must be able to individualize his patients, and this takes large experience. Nevertheless it may be at least noted that Baer reports prolongation of labor, increased fetal asphyxia, thirst, severe headache, very difficult control of patients, and also great difficulty in the observance of aseptic technique, due to the mental state of many of the patients. He also reports an increased number of cases of postpartum hemorrhage. In this series delirium was noted in a considerable number of the patients.

Now let it be remembered that the so-called "twilight sleep" was offered as a panacea for the pains of childbirth, and that when its advocates pleaded its cause a year or so ago we heard nothing as to the necessity for any other anesthetic during the whole course of labor. Not only the aforesaid popular magazines and department stores, but even members of the profession under the influence of Germanic "cultur" assured us that the hypodermic was woman's best friend, and that the conscious suffering of childbirth was a thing of the past. What the present attitude of the lay press and the "delivery departments" of certain large stores may be I know not, but the enthusiastic professional advocates of two years ago have relegated this method to its proper position, namely, as an adjuvant to the first stage. Here there is no doubt of its value, particularly if divested, as no doubt it will be, of its nonsensical trappings. In a word, the benefit which we have received from the popularization of "twilight sleep" is the realization that small doses of scopolamine, combined with one dose of morphine, may be of greater value than morphine alone in highly neurotic women during the first stage of labor, but that as a means to secure a painless delivery it is both non-efficient and dangerous, the danger being due to the impossibility of individualizing patients, together with the uncertainty of the action of the drugs and also their relatively slow elimination, which can in no way be hastened. Even had we no better means at our command by which to accomplish our end, I believe that scopolamine-morphine would have soon joined the large collection in the "lumber-room" of medicine. Fortunately, however, we have a therapeutic resource which bids fair to accomplish all the unfulfilled promises of "twilight."

The anesthetic properties of nitrous oxide were discovered by Sir Humphrey Davy in 1800, eighteen years before the discovery of ether and forty-seven years before Flourens demonstrated the anesthetic properties of chloroform. In 1863 Andrews suggested the use of oxygen with

nitrous oxide, and Klikowitsch of Petrograd used it in a series of twenty-five deliveries in 1880. Within the last few years much attention has been paid to this agent as an analgesic during labor. The disadvantage of this method is the relatively cumbersome and expensive apparatus which is necessary as compared to the hypodermic armamentarium of the scopolamine-morphine enthusiasts or to the bottle of chloroform or ether. Moreover it is decidedly more expensive to administer, costing at least one dollar and a half per hour. On the other hand its superiority over any other method of analgesia is so great that these real disadvantages are outweighed. After one has had a little experience in the use of the apparatus it will be found that gas oxygen is 100 per cent efficient instead of failing in from 10 to 40 per cent of cases, as does scopolamine. Again, it is more rapid in its analgesic action and much more quickly eliminated than any other anesthetic agent, thus rendering possible the most complete analgesia during the pains with complete consciousness between them. It is no more dangerous than ether, and is vastly less dangerous than chloroform or morphine-scopolamine. It is true that anesthesia to the surgical degree has resulted in death in a considerable number of cases, and I feel that the evidence compels us to consider gas oxygen as a little more dangerous than ether in deep anesthesia if both be given by competent administrators. In the hands of the ordinary hospital interne there is no question but that gas is much the more dangerous of the two, if their use as surgical anesthetics is under discussion.

The above digression is necessary to again call attention to the fact that we are only considering analgesia and not surgical anesthesia, and that as gas can only kill by asphyxia, and has a very wide margin between the dose required for analgesia and the toxic dose, it is a perfectly safe analgesic if only attention be paid to the color of the patient. It is I believe a safe anesthetic, in skilled hands, for the major obstetric operations; Webster as early as 1909 employed it in Cæsarian section, and I know it to be ideal for outlet forceps and suture introduction; but this is still aside from the question under consideration. What we are now really discussing is the relative value of nitrous oxide as compared with scopolamine-morphine as an analgesic in normal labor.

The greatest danger proposed by the opponents of gas oxygen is that asphyxia of the child will be greatly increased. From my own experience, from the experience of my friends, and from the literature, I believe that there is no more, indeed, if anything a somewhat lessened, danger of asphyxia neonatorum under gas than under ether, the degree of anesthesia being the same in each instance. This is but natural, both because of the rapidity with which the nitrous oxide is eliminated and because there is reason to believe that nitrous-oxide-oxygen anesthesia, no matter to what depth, is not due to asphyxia alone, but that there is some specific anesthetic action as in ether or chloroform. Moreover, labor is not prolonged, but really seems to be shortened. I have seen cases, in which the administration was begun in the second stage, change the character of their pains as though pituitrin had been given. During the agonal period of the perineal stage complete analgesia can be quickly secured, and yet, as soon as the child is delivered, the woman is entirely conscious and is free from the relaxation and nausea which so often accompany ether. Moreover, the uterus in gas cases has, in my experience, contracted more promptly than after any other anesthetic. This last point is of the greatest importance, since there can be no question as to the advantage of having a woman completely uninfluenced by any anesthetic from the moment of the delivery of the child until the placenta has been expelled, one of the prolific causes of postpartum hemorrhage being a more or less deep anesthesia at the time of delivery, resulting, as it frequently does, in uterine participation in the general relaxation. Nitrous-oxide-oxygen enables one to attain this desideratum perfectly, while no other anesthetic even approaches it.

Finally, when it is desired to repair a

laceration of the perineum one can insert the stitches with comfort, the patient being completely analgesic, and yet between each stitch the woman may be perfectly conscious. Three or four inhalations are ample to enable one to place each stitch, and the obstetrician may avoid the necessity of soiling his tender conscience with the threadbare lie that stitches introduced immediately after labor do not hurt much "because the perineal tissues are at this time but slightly sensitive."

TREATMENT OF SCIATICA AND NEURITIS OF OTHER PERIPHERAL NERVES WITH HOT SALINE SOLUTIONS.[1]

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The present study embraces sixteen cases of sciatica, eight cases of neuritis of the anterior crural nerve, six cases of neuritis of the external peroneal nerve, and two cases of neuralgia of the infraorbital nerve. The latter two may be contested as not being genuine cases of neuritis, since we are concerned exclusively with cases of neuritis. It should be borne in mind that a sharp distinction between neuralgia and neuritis cannot be established. The latter, of course, implies a material underlying basis, the former only a subjective symptom. Nevertheless in cases of neuralgia, even in recent ones, great presumptions exist in favor of their organic nature. Microscopical examinations of excised peripheral nerves and Gasserian ganglia have shown that in a number of cases degenerative changes were present. More or less intense alterations of a chronic inflammatory character have been found in the ganglion as well as in the peripheral branches in cases of neuralgia. Whether the primary inflammatory process lies in the ganglion or in the nerve trunk, it has not been as yet definitely established. Besides a peripheral and a ganglionic origin of pain in neuralgia, there may be also a central which can be seen from the fact that neuralgic pain is sometimes felt in another region than that of the nerve irritated. Finally a pathological state of the blood-vessels of the peripheral nerves may be the original cause of pain in a nerve.

According to Dana (*Medical News*, 1891), Thomas (*Deutsches Archiv f. Klin. Medizin*, v. xliii, p. 188), and Rose (*Transactions of the Med. Soc. of London*, v. xv, 1892), arteritis is the chief cause of neuralgia. In a contribution entitled "Is Neuralgia a Functional Disease," published in the *New York Medical Journal* of July 21, 1906, I put on record the pathological findings of eight cases of trifacial neuralgia. The duration of the affection ranged between seven years and three months. It was interesting to observe that in all of them without exception a more or less pronounced organic change was present either in the nerve bundles themselves or in the nervi nervorum, but in all cases the blood-vessels showed some thickening of their walls. Even in Case VI of my series, in which the neuralgia existed but three months, distinct nerve alterations were seen. In the light of these observations one must admit that the occurrence of degeneration of the peripheral nerves is frequent if not constant in neuralgia; that it is difficult if not impossible to draw a distinction between neuritis and neuralgia.

This being established let us now consider the chief subject of the study, viz., the therapeutic effect of hot saline solution on the element of pain in cases of involvement of peripheral nerve trunks. Without entering into long speculations as to the intimate influence of the fluid on the nerve, I may only recall that in my report on alcoholic injections for facial neuralgia (THERAPEUTIC GAZETTE, Aug. 15, 1909) I expressed the opinion that in view of frequent involvement of interstitial tissue of the nerve trunks the alcohol has some altering effect on this tissue (endoneurium,

[1]Read before the Section of Medicine of the College of Physicians, Feb. 28, 1916.

peri- or epineurium) by relieving the pressure upon the sensory nerve filaments, the irritation of which maintains the tenderness of the nerve trunks. That the connective tissue is particularly affected by alcohol can be seen from an experimental study on dogs (*Jour. of Nerv. and Ment. Dis.*, February, 1914), which I undertook with the object of determining whether alcoholic injections into peripheral nerves so frequently employed are innocuous or not, and if so to what extent. The histological study of the nerves into which the injections were made, also of Gasserian and spinal ganglia connected with those nerves, as well as of the central endings of the nerves in the medulla and spinal cord, enabled me to draw the following conclusions:

The pathological changes vary in motor and sensory and mixed nerves. In all cases the connective tissue is influenced. Motor nerves present a great degree of resistance to alcohol: the nerve fibers themselves resist perfectly, and the connective tissue alone is influenced. In sensory and mixed nerves not only the connective tissue but also the nerve fibers are involved, and the latter becomes damaged with great rapidity. Indeed, clinically we observe prolonged and even permanent sensory disturbances in cases of purely sensory nerves; also sensory, motor, and trophic disturbances in cases of mixed nerves. The rapidity with which material disturbances are set up in sensory and mixed nerves, also the progressive character of these disturbances, are all indications of a high susceptibility of such nerves to the effect of an irritating substance like alcohol. While the latter relieves pain, it produces nevertheless an objective sensory disorder which may remain permanent and lead eventually to trophic disturbances. In two of my cases I saw an eruption appear in the anesthetic area: in one case the patient happened to fall, and thus injured the skin over the affected region; it took three months before the wound healed up. Schlösser (*Klin. Monatsblatter f. Augenheilk.*, 1903, Bd. 41 (2), s. 244) records a persistent peroneal paralysis following treatment of sciatica by alcoholic injections. Brissaud, Sicard, and Tanon (*Revue Neurologique*, 1906, p. 633) observed paresis and trophic disturbances follow injections of alcohol into mixed nerves.

In view of these clinical and experimental data, which demonstrate the possibility of direct damage of alcohol to the nerves, I have abandoned the former method and commenced to use physiological salt solutions in its place. At first the solutions were used at various temperatures. After a large number of trials the observations which I made led me to believe that saline solutions of high temperature give better and more lasting results than when the fluid is tepid or cold. Accordingly the entire series was uniformly treated after preliminary medicinal treatment with injections of hot saline solutions. The latter were always prepared with freshly distilled and sterilized water for immediate use. Any large syringe of glass or metal can be used, and a needle which is used for lumbar puncture can be employed here. The needle is inserted first, and if no blood appears at its outer end the syringe is attached, after all air is expelled from it. The piston of the syringe should be pushed in slowly to avoid sudden expansion and tearing of the tissue and possible hemorrhages.

According to the nerve and to its localization the amount of fluid injected will vary. For the sciatic nerve, for example, I injected as much as 200 Cc. For the anterior crural nerve 50 Cc. was injected at a time. The same quantity was used for the external peroneal nerve. For relief of infraorbital neuralgia 10 Cc. was utilized.

As to the selection of the points for the treatment of various nerves the following rules were observed: For the sciatic nerve the point of juncture of the inner and middle thirds of a line passing between the tuber ischii and the great trochanter; for the anterior crural nerve the inner third of the outer half of a line passing between the anterior superior spine and the root of

the external genitalia; for the external peroneal nerve the base of the fibula; for the infraorbital nerve the foramen of the same name in the superior maxilla.

The distribution of pain and objective disturbances in my cases were as follows: In the sciatic neuritis there was, besides pain at the sciatic notch and along the posterior aspect of the thigh and leg, also difficulty in walking and hyperalgesia of the entire lower limb, besides Lasègue's sign, which, as is well known, consists of pain brought on by extension of the leg. Not all these symptoms were present in every case. In some sciatic cases the pain was absent in the calf muscles; in others there was no special difficulty of walking; and in still others the hyperalgesia of the limb was very slight or totally absent.

In the cases with neuritis of the external peroneal nerve there was pain on pressure immediately below the fibula, some paralysis of the external group of muscles of the leg and consequently some foot-drop, also some hypesthesia on the anteroexternal surface of the leg below the knee. All these symptoms were unequally distributed in all the cases.

In the cases with neuritis of the anterior crural nerve the quadriceps femori was paretic, and there was distinct diminution of objective sensibility on the anterointernal surface of the thigh, and on the inner side of the leg as far down as the ball of the foot. There was a marked tenderness on pressure over the uppermost portion of the anterior surface of the thigh. There was also a difficulty in raising the leg while walking, and an inability to stand on the right foot.

In the cases with infraorbital neuralgia the pain was immediately beneath the inferior border of the orbit; also in the gums of the upper jaw, and hyperesthesia over the side of the nose and upper lip.

The number of injections of hot saline solution varied in each individual case. The following is the general rule which I have adopted after many trials, subject to modifications in accordance with the duration of the relief obtained after each injection: In the sciatica cases an injection was given at first every four days. If the pain subsided after the third injection two subsequent injections were given —one a week. The following injections were given every two weeks if relief was not complete. Ordinarily the pain disappeared after the fifth or sixth injection. The same general rule was observed in the cases with neuritis of the anterior crural and external peroneal nerves. It is interesting to note that fewer injections were required for neuritis of these two nerves than in the cases with sciatica. In the infraorbital neuralgia the number of injections required was greater than in neuritis of any of the other nerves, inasmuch as one of the patients came for a period of four months each week for a treatment.

While some of the patients are still under observation, nevertheless the results so far obtained are far superior to those with any other method. I must add that no medication has been taken by the patients while under this local treatment. Hygienic and dietetic rules are nevertheless being kept up. As to local effects of the injections there is usually observed a slight swelling and a tenderness of the surrounding tissue. The swelling disappears in twenty-four or forty-eight hours. The tenderness remains somewhat longer. At no time were there seen trophic disturbances of any nature. The patients become able to move about and to walk on the street without much or any discomfort, their insomnia disappears, and they gain in weight. Some of the patients have been free from pain for months and even two years, others have some recurrences, but of a very mild nature. A repeated injection promptly relieves the disorder. I am unable at present to report permanent cures, as sufficient time has not elapsed since the treatment was commenced, but I am able to speak of great relief and of the superiority of this method over all others known to me, including surgery. I am warranted therefore to recommend it in the most emphatic manner.

EDITORIAL.

THE ALLEN TREATMENT OF DIABETES AND CAUTION.

Many of our readers are familiar with the plan of treatment of diabetes mellitus brought forward during the last two years by Dr. Allen because we noticed it in a leading article in the January issue, a number of reports have been made upon it in various medical journals, and also because we have noticed the appearance of the first and second editions of a little book which describes the methods followed by the originator of this plan. Like many plans it is not entirely original, differing only from temporary starvation of the diabetic in that the starvation is more rigorous and that it is instituted at once in its most severe form.

It has been known for years by every one who has studied this disease that diabetic patients can often be made sugar-free if their intake of food, particularly of the carbohydrates, is materially decreased or entirely arrested. It has also been known to be a fact that such patients when permitted to receive starchy foods are often found to be capable of retaining and utilizing a larger amount of sugar than before they were starved. And, again, it has been well known that certain forms of starch, like that found in the potato, in oatmeal, and in rice, are apparently more easily assimilated and retained by such patients than is the starch from which bread is made. Once more it can be said, without fear of contradiction, that those who have had the largest experience in the treatment of diabetes recognize the fact that in cases which have lasted long enough the body is not alone suffering from the loss of sugar, but that it also turns upon its fats and proteins, destroys them, and makes sugar in the process. The organism is therefore self-destructive under such conditions, the more so as the educts from this utilization of the fats result in the development of poisons which induce diabetic coma, and the acid character of these poisons robs the body of alkaline substances.

In other words, the most serious problem in a case of diabetes is not so much the large amount of sugar which may be eliminated, as the degree to which these secondary compensatory, but nevertheless destructive, processes are carried out.

We believe that it is essential for the safe and proper treatment of every case of diabetes that he should remain upon his ordinary diet until the physician, by daily examinations of the twenty-four hours' urine, obtains a clear conception of the average amount of sugar loss, and determines whether the ketone bodies, which are associated with acidosis, are present, and if so, in what relative quantities, since acetone shows that the body oxidizes oxybutyric acid into diacetic acid and then into acetone, whereas if oxybutyric acid is found in the urine it indicates that the oxidizing power of the body is unable to reduce this poisonous substance into innocuous acetone. The physician, in this way gaining a conception of the status of the patient in relation to his disease, can then institute such dietetic rules as will fit the particular individual, and, still continuing his examinations of the urine, be able to compare the results obtained with the standards reached or discovered in the first days of observation. To our minds Allen's proposition, which ignores these facts, jeopardizes a certain number of patients. We have more than once seen the institution of a strict antidiabetic diet plunge the patient from a condition of fair health into diabetic coma within a day or two.

We think it also a good rule and practice to recognize the fact that no one routine method of treatment can be employed in all patients suffering from the same disease, since that which suits one patient may be quite improper or ill-advised for another. In other words, the recommendation that the Allen treatment be instituted promptly in every case is, we believe, unfortunate and unwise. For these reasons we have

perused with much interest a contribution by Joslin, Brigham, and Hornor, in the *Boston Medical and Surgical Journal* of March 16 and 23, in which they report fourteen cases of diabetes mellitus unsuccessfully treated by fasting. Possibly no one in this country has done more toward the scientific investigation of this obscure malady than Joslin, and therefore anything which he may say in regard to this matter is of the greatest possible importance.

It is only fair to state that, in the opening of their article, these writers say that they thoroughly believe in the fasting treatment of diabetes as outlined by Dr. Allen, and that under this treatment their diabetic patients do better than ever before. They go on to say, however, that their object in publishing this paper is to show that some of the patients so treated have died, and to point out the apparent failure. They have used alkalies less and less in the treatment of acid intoxication, endeavoring to avoid the necessity for the use of alkalies by preventing acidosis. They have found it advantageous, however, in long-standing and complicated cases, without otherwise changing the habit or diet, to begin the treatment by omitting the fats in order to decrease the source of the acid bodies, after two days to omit the protein and simultaneously to halve the carbohydrates daily to 10 grammes, and then, if sugar has not disappeared from the urine, to fast the patient. There is not space in this leading article to quote in detail their various accurate and scientific observations, which were made upon the respired air and the contents of the urine. Those who wish to look into this matter further will find this portion of their study most interesting.

The opening paragraph of the second section of their paper states, in different words, the views we have already expressed in this article, as follows: "Changes in the diet and regimen of patients who have suffered from diabetes for many years are always dangerous, and particularly so when the case is of extraordinary length. Treatment of such individuals should never be undertaken lightly nor without a full realization of the gravity involved." Their feeling in this view is emphasized by their quoting a case in which for nine days after the patient came under observation she was not allowed to make the slightest possible change in her regimen. These authors close their paper with these words: "The experience derived from these patients has led us to adopt a preparatory treatment to fasting for very severe, long standing, and complicated cases. The plan which they follow we give below, as printed in the journal from which we quote:

SUMMARY OF TREATMENT.

Fasting. Fast until sugar-free. Drink water freely, and tea, coffee, and clear meat broth as desired. In very severe long standing and complicated cases, without otherwise changing habits or diet, omit fat, after two days omit protein and halve carbohydrate daily to 10 grammes, then fast.

Carbohydrate Tolerance. When the 24-hour urine is sugar-free, add 150 grammes of 5-per-cent vegetables and continue to add 5 grammes carbohydrates daily up to 20, and then 5 grammes every other day, passing successively upward through the 5, 10 and 15 per cent vegetables, 5 and 10 per cent fruits, potato and oatmeal to bread, unless sugar appears or the tolerance reaches 3 grammes carbohydrate per kilogramme body weight.

Protein Tolerance. When the urine has been sugar-free for two days, add 20 grammes protein (3 eggs) and thereafter 15 grammes protein daily in the form of meat until the patient is receiving 1 gramme protein per kilogramme body weight, or if the carbohydrate tolerance is zero, only ¾ gramme per kilogramme body weight.

Fat Tolerance. While testing the protein tolerance, a small quantity of fat is included in the eggs and meat given. Add no more fat until the protein reaches 1 gramme per kilogramme (unless the protein tolerance is below this figure), but then add 25 grammes daily until the patient ceases to lose weight or receives not over 40 calories per kilogramme body weight.

Reappearance of Sugar. The return of sugar demands fasting for 24 hours or until sugar-free. The diet is then increased twice as rapidly as before, but the carbohydrate should not exceed half the former tolerance until the urine has been sugar-free for two weeks, and it should not then be increased more than 5 grammes per week.

Weekly Fast Days. Whenever the tolerance is less than 20 grammes carbohydrate, fasting should be practiced one day in seven; when the tolerance is between 20 and 50 grammes carbohydrate, upon the weekly fast day 5 per cent vegetables and one-half the usual quantity of protein and fat are allowed; when the tolerance is between 50 and 100 grammes carbohydrate, the 10 and 15 per cent vegetables are added as well. If the tolerance is more than 100 grammes carbohydrate, upon weekly fast days the carbohydrate should be halved.

STRICT DIET.

MEATS, FISH, BROTHS, GELATINE, EGGS, BUTTER, OLIVE OIL, COFFEE, TEA, AND CRACKED COCOA.

FOODS ARRANGED APPROXIMATELY ACCORDING TO PER CENT OF CARBOHYDRATES.

VEGETABLES (FRESH OR CANNED).

*5 per cent.**

Lettuce	Sauerkraut	Okra
Cucumbers	Beet greens	Cauliflower
Spinach	Dandelion greens	Egg Plant
Asparagus	Swiss chard	Cabbage
Rhubarb	Celery	Radishes
Endive	Tomatoes	Leeks
Marrow	Brussels sprouts	String-beans
Sorrel	Watercress	Broccoli
	Sea kale	

10 per cent.

Pumpkin	Squash	Onions
Turnip	Beets	Mushrooms
Kohl-Rabi	Carrots	

15 per cent.

Grees peas	Parsnips	Canned Lima beans
Artichokes		

20 per cent.

Potatoes	Baked beans	Boiled rice
Shell beans	Green corn	Boiled macaroni

FRUITS.

5 per cent.

Ripe olives (20% fat)		Grape fruit

10 per cent.

Lemons	Strawberries	Peaches
Oranges	Blackberries	Pineapple
Cranberries	Gooseberries	Watermelon

15 per cent.

Apples	Blueberries	Raspberries
Pears	Cherries	Huckleberries
Apricots	Currants	

20 per cent.

Plums	Bananas	Prunes

NUTS.

5 per cent.

Butternuts	Pignolias	

10 per cent.

Brazil nuts	Hickory	Filberts
Black walnuts	Pecans	

15 per cent.

Almonds	Beechnuts	Pine nuts
Walnuts (Engl.)	Pistachios	

20 per cent.

Peanuts

40 per cent.

Chestnuts

MISCELLANEOUS.

5 per cent.

Unsweetened and Unspiced Pickle, Clams, Oysters, Scallops, Liver, Fish Roe.

(30 grammes 1 oz.) CONTAIN APROXIMATELY	PROTEIN. G.	FAT. G.	CARBOHYDRATE. G.	CALORIES.
Oatmeal, dry weight	5	2	20	120
Meat (uncooked, lean)	6	3	0	50
Meat (cooked, lean)	8	5	0	75
Broth	0.7	0	0	3
Potato	1	0	6	25
Bacon	5	15	0	155
Cream, 40%	1	12	1	120
Cream, 20%	1	6	1	60
Milk	1	1	1.5	20
Bread	3	0	18	90
Butter	0	25	0	225
Egg (one)	6	6	0	75
Brazil Nuts	5	20	2	210
Orange or Grape Fruit (one)	0	0	10	40
Vegetables 5 and 10% group	0.5	0	1 or 2	6 or 10
Oysters, six	6	1	4	50

1 gramme protein, 4 calories.
1 gramme carbohydrate, 4 calories.
1 gramme fat, 9 calories.
1 gramme alcohol, 7 calories.
6.25 g. protein 1 g. nitrogen.
1 kilogram=2.2 pounds.
30 grammes (g) or cubic centimeters (c.c.)=1 ounce.
A patient "at rest" requires 25 per kilog. body weight.

*Reckon available carbohydrates in vegetables of 5% group as 3%, of 10% group as 6%.

The point which the writer of this article wishes to make, and emphasize, is not that the Allen treatment of fasting diabetics is essentially erroneous, or that it will not, in a large number of cases, produce excellent results, but that it cannot be applied haphazard in all cases, and that, if so applied, it will sometimes induce disaster, for every case of diabetes should be approached by the physician "reverently, discreetly, and in the fear of God."

THE PITUITARY BODY AND ITS EFFECTS UPON NUTRITION AND DEVELOPMENT.

Entirely apart from the extraordinary interest and importance which is centered in the active principle of the posterior portion of the pituitary body as exercised upon the circulatory apparatus and the uterus, it is becoming increasingly evident that this posterior lobe exercises other functions in the body and that the anterior lobe may possess valuable therapeutic properties in a limited class of cases which, because they cannot be benefited in any other way, ought to receive special attention at the hands of those who keep themselves abreast of all the real advances which are made in our knowledge concerning the glands of internal secretion. We have known for a number of years that part of the gland has an extraordinary effect on growth, and also that it is connected with the ability of the body to retain sugar. Constantly increasing evidence shows that the anterior lobe in early life has much to do with physical development, and later with the development of the sexual organs and sexual characteristics.

One of the most exhaustive and interesting papers which have appeared in connection with this important subject has been contributed by Goetsch to the *Bulletin of the Johns Hopkins Hospital* for February, 1916, who reports a number of experiments made upon the lower animals. He shows, amongst other things, that the feeding of young male rats with extract of the anterior lobe resulted in a definitely stimulating effect upon the growth of the

animal body as to gain in weight and in its general appearance of vigor. There was also earlier descent of the testicles and the glands appeared larger and more vascular than the testicles of a control animal which, at the start of the experiment, had been of the same size. In other words, the use of the anterior lobe extract shortened the period of complete sexual development by one month, or one-third. When the posterior lobe extract was employed in another experiment it failed to produce a stimulating influence upon the development of the sexual glands in any way comparable to that exerted by the anterior lobe extract.

Further experiments upon the effects of the anterior lobe extract upon breeding and pregnancy were also performed. In the case of female rats there was an increase in weight and growth comparable to that which occurred in the male rat when the anterior lobe extract was given, and a pair of rats that received the anterior lobe extract bred at the age of three and one-half months, which is much earlier than is usually the case. An examination of the ovaries of the fed animals showed that they were better developed at the same age than in those which did not receive anterior lobe. There was greater vascularity and the Fallopian tube had a more freely branched fimbriated extremity, the uterus was better developed, and the sexual apparatus better fitted for functional activity. The author then goes so far as to conclude, from some experiments carried through more than one generation, that the second generation may be influenced by feeding the first with the anterior lobe.

If the entire gland is given the results are not so marked, but the author seems to think that in instances where faulty development exists the best results will be obtained by giving pituitary whole gland extract rather than the extract of one lobe. It may, however, be definitely stated that the extract of the posterior lobe does not stimulate growth in general and the development of the sexual glands as does the anterior lobe even after a very short period of use.

What the exact bearing of this research will be upon human medicine it is at present difficult to determine. An interesting field of observation is, however, opened to physicians who have cases which fail to develop, as puberty approaches, to the extent which is normal. It would appear that they are justified, from this and other researches, in administering extract of the anterior lobe, the more so as a considerable number of cases have now been reported in human beings in which great improvement has followed its use.

CASES IN WHICH FOOT-PLATES FAIL.

In hospital practice and to a large extent in private practice physicians often meet with painful feet, painful legs, or painful back, which seem to have their origin in so-called "flatfoot." A certain proportion of these patients, particularly in youth, can be benefited by exercise designed to improve the strength and formation of the arch of the foot. In elderly people, particularly if they have gained greatly in weight, such measures often fail, and so-called "inner soles" are often advantageous. In some instances the patient gives a long history of having been treated for gout in the feet, or for muscular rheumatism, and has failed to obtain any relief after trying everything possible, from the salicylates and iodides to the celebrated mineral springs in this country and in Europe.

In the discussion of the treatment of any condition it is as necessary to recognize states which cannot be improved by ordinary familiar measures as it is to recognize those which can be improved, and, therefore, we wish to call attention to a type of patient who, it is true, suffers from "flatfoot," but who in addition presents feet which are cyanotic, congested, covered with clammy skin, and manifestly suffering from a poor arterial circulation, with the veins greatly enlarged. Manipulation of the feet does not cause pain, but the patient often complains bitterly of such pain when in bed, and may be so lame as to be incapacitated for walking. The fact that the symptoms are better in warm weather than in cold

does something to increase the view, on the part of the patient, that he has rheumatism, the more so as the pain extends up the legs.

In the *Journal of the American Medical Association* of November 27, 1915, Frauenthal writes upon this important subject, and states that the condition is particularly prevalent among Russians, Poles, and Galicians; that its underlying cause is obliterating endarteritis, as is indicated by the pulsation in the arteries supplying the feet; furthermore, that such feet may play an important part in medicolegal cases where there are suits for damages against corporations, and still more important that any operative interference, even for minor conditions, on the part of the physician may result in grave complications, because healing does not easily take place and infection readily occurs.

He states that the best method of treatment is the administration of $\frac{1}{5}$ grain of extract of thyroid gland three times a day, the subcutaneous injection of from 300 to 500 Cc. normal salt solution, and the daily exposure of the patient's feet for twenty minutes to white light to the point of tolerance of heat. In this type of case so-called inner soles or foot-plates make a patient distinctly worse and should be ordered only with great care.

THE SIGNIFICANCE OF VESICAL SYMPTOMATOLOGY IN RENAL CONDITIONS.

There is a commonly accepted belief that vesical symptoms, aside from frequency, at times slight urgency, and during renal colic difficulty in passing urine, are as a rule not characteristic of either medical or surgical affections of the kidney; nor is this belief negatived by Braasch (*Transactions of the American Association of Genito-Urinary Surgeons*, vol. x, 1915), who notes that the renal conditions which most frequently cause vesical symptoms are tuberculosis, pyelonephritis, and lithiasis; in the two former conditions there is usually an associated cystitis. Of 203 cases of renal tuberculosis reported by him several years ago practically all exhibited vesical symptoms of months or many years' duration, and many of them were treated by lavage of the bladder and various internal medicaments. Braasch thinks that all cases of persistent irritability of the bladder with pyuria should be regarded as possibly due to renal tuberculosis until the contrary be proved.

Early recognition is of prime importance, as it indicates as a rule an entirely effective and safe surgical procedure, and it prevents the unfortunate deep-seated infection of the bladder which is so difficult to eradicate. *Per contra*, a well-advanced renal tuberculosis with comparatively slight irritation of the bladder may occur particularly in the female. Gross and free hematuria originating in the tuberculous kidney may occasionally occur before any vesical irritability has developed. The earliest vesical symptom is increased frequency somewhat out of proportion to the polyuria.

Diffuse infections of the renal parenchyma and pelvis with organisms other than tubercle bacilli, which come under the term of pyelonephritis, usually cause a variable degree of infection of the bladder; the resultant cystitis, being as a rule less severe than that which occurs in tuberculosis, is characterized by less marked symptoms. At times a differential diagnosis even with the cystoscope is hard to make. Pyelonephritis as a cause of cystitis in the adult male was found in 109 of 121 cases recently reported in the Mayo clinic. Hence all cases of cystitis should be examined with a view to the possibility of renal infection. This of course implies ureteral catheterization. Nor does a single negative finding exclude the possibility of a quiescent renal infection. Demonstration of dilatation in the outline of the renal pelvis or ureter is regarded by Braasch as conclusive evidence of previous active infection even though the urine fails to show evidence of active infection on microscopic examination. A pyelogram will demonstrate this, and the finding may be further corroborated by renal functional tests, a pyelonephritis being characterized by a considerable decrease in the phenolsulphonephthalein output, whereas

there is but little decrease with pyelitis. At times this test fails.

The absence of vesical irritability coincident with pain would be a factor in exclusion in the interpretation of a doubtful renal or ureteral shadow when stone is suspected. Pain with low ureteral stone is localized to the suprapubic or low inguinal area and is usually the result of a localized periureteritis. It is particularly in children that the radiation of pain in renal lithiasis may be largely referred to the area of the bladder.

There is a type of vesical irritability characterized by the term neurosis for which no cause can be found, nor is an extravesical cause of bladder symptoms at all common. When vesical symptoms do result from extra-vesical cause, they are the result of (1) pressure of a tumor; (2) mechanical interference; (3) malignant involvement; or (4) direct extension of an adjacent inflammatory process.

A very small proportion of uterine tumors cause any vesical symptoms. Secondary involvement of the bladder is also comparatively rare, at least from the uterus; from the rectum it is somewhat more common. Extension to the bladder of acute inflammatory pelvic conditions is also rare; it can be recognized by the cystoscope.

THE PROGNOSIS OF URETHRAL STRICTURE.

To the reviewer of current literature it would seem that urethral stricture has been practically abolished from the list of surgical affections, though there are a sufficient number of articles dealing with gonorrhea and its consequences to lead to the inference that urethral narrowings may still be of comparatively frequent occurrence. It is true that stricture if not traumatic is always the result of a chronic urethritis of gonorrheal origin, the inflammation persisting in the follicle and perifolliculitis developing with a resultant fibrosis gradually lessening the lumen of the canal. It is also true, though this would not appear from current literature, that there have been no material advances made in the treatment of acute gonorrheal urethritis in the last twenty or thirty years, if we except the prophylaxis, the abortive treatment, and the generally accepted view that those irrigations and injections are least harmful which are least irritating.

It might seem that the therapeutics of stricture is so entirely settled that further writing on the subject is unnecessary. This view is not in consonance with the clinical experience of surgeons who see any considerable number of genito-urinary cases. There is certainly a growing tendency to refer stricture cases to the specialist, and therefore these cases receive more skilful and efficient treatment than in former times.

Keyes (*Transactions of the American Association of Genito-Urinary Surgeons*, vol. x, 1915), in an effort to throw some light upon the prognosis of urethral stricture, has collected the available data in the office case books of himself and his father concerning 583 cases of narrowing of gonorrheal origin. Sixteen cases were treated with electrolysis, with no deaths and very little advantage; forty-eight by divulsion, with one death by pyemia (this patient was divulsed to 45 F.); two hundred and eighty-three by sounds without any operation, with one death, anuria incident to retention relieved by filiform and the passage of sounds. There were 236 operated upon, 112 by external urethrotomy, with seven deaths, five being from urinary sepsis, one from hemorrhage, and one from rupture of an aortic aneurism in the third week. Of the 124 operated upon by internal urethrotomy only one died, of renal insufficiency and sepsis on the second day. The combined immediate mortality of these 583 cases was 10 deaths, or less than 2 per cent—a small average, if we consider that these data extend from before 1870 to the present time. In a number other operations, such as incision of the bladder neck, lithotomies, urethral dissections, nephrotomies, and prostatectomies, were done in connection with the urethral cutting.

Keyes defines stricture as that infiltration of the urethral wall which may be expected to contract progressively. Strictures of a large caliber may be considered simply as

the sclerotic base of a chronic urethritis. If they be dilated sufficiently to cure the urethritis, they will not contract except as the result of a new inflammation.

Keyes shows that most strictures develop within a year of a gonorrhea and submit to a dilatation within two or three years of their inception; a very large minority develop very late or excite symptoms which the patient may neglect for many years. Stricture at or anterior to the peno-scrotal angle contracts to a far less degree than stricture posterior to this point. As to the relapse of stricture cases, they may stay well for periods of ten or fifteen years without treatment, but rarely without symptoms.

The criterion of cure would be five years without treatment and an unobstructed passage of a full-sized sound. Five years without treatment will not suffice. Many of Keyes's patients kept their lesions under control for many years at the expense of having a full-sized sound passed once a year in order to forestall recontraction. If the patient uses a sound smaller than 26 or 28 it usually has to be passed every month or so, or even oftener. An overwhelming majority of stricture cases refuse to continue passive sounds and so relapse into retention, periurethritis, and renal complications.

Internal urethrotomy will cure simple uncomplicated stricture of the pendulous urethra. These strictures are as a rule not amenable to dilatation. As many cures were accomplished by internal urethrotomies of the pendulous urethra up to 32 or 33 as by cutting to 38 and 40.

Stricture of the bulb can be best controlled by dilatation up to 27 to 29. Of the many cases dilated in this series, although of much greater size, none have remained long enough to be in any sense a cure. Internal urethrotomy is called upon only to divide dense scar tissue. This can usually be done without cutting any higher than 31 or 32. Deeper incision is dangerous and has no distinct advantage, for a urethra cut as high as 36 or 38 F. will usually be found to have contracted to about 30 F. several years after operation.

Stricture of the bulb may be controlled by dilatation to about 30 F. size. It then must be kept open for the rest of the patient's life by the passage at least once a year of a full-size sound to forestall or to diagnose recontraction. From which Keyes concludes that no patient can ever be guaranteed cured of stricture, least of all in the bulbous urethra, yet five apparent cures have been observed, the duration being from 12 to 28 years.

REPORTS ON THERAPEUTIC PROGRESS.

THE RADICAL TREATMENT OF RHEUMATOID ARTHRITIS.

In the *Lancet* of January 15, 1916, ROWLANDS says that it is convenient to recognize the following types of rheumatoid arthritis marked off according to age, for they exhibit certain features characteristic of each:

A. The adolescent. The disease here usually attacks the larger joints—the knees, hips, wrists, and shoulders in this order of frequency—but should there have been an old injury to either of these joints this is the one first affected. It is accompanied by severe pain, and the onset is more rapid than in the other types. It is often mistaken for tuberculous disease, and he has seen it treated as such with unfortunate results. Rowlands remembers, for instance, being called to see a case of this kind in which one leg had been amputated above the knee and the opposite knee and hip were attacked, and in which the septic condition of the patient's mouth had been quite overlooked. The treatment of such cases is difficult, but if only the diagnosis is made early and the source of infection treated the results are quite good.

B. Middle-age type. This commonly begins about the age of forty, and the largest number of all cases of rheumatoid arthritis belong to this group. It is the

form of disease most amenable to treatment, provided the source of infection can be found and dealt with. Mention may be made of a subvariety of this group, where the progress of the disease is rather more acute with exacerbations of acute swelling of the joint with fluid.

C. Senile type. This occurs in patients over fifty and is not accompanied by much pain; it usually attacks the smaller joints to begin with; wasting of the muscles and deformity are pronounced. Owing to the absence of pain patients coming under this group rarely seek treatment until the condition is very far advanced, when, of course, it is less amenable to treatment.

The cardinal point of the treatment is disinfection of the original focus, but it is only in the early cases that removal of the source of infection will at once cure the condition. In the cases of longer standing the toxemia itself has also to be treated, and for this purpose vaccine therapy has proved of great assistance. Autogenic vaccine should always be prepared, the use of stock cultures being of little avail. The pathogenic organism can sometimes be isolated only with considerable difficulty; in such cases it is often possible to discover it in the urine, and this should always be examined if the organisms are not obtained elsewhere. The urine should be drawn off with all aseptic precautions into a sterile flask and incubated in bulk for eight to twelve hours. This should now be inoculated on to suitable media. In the case of pus a swab is taken by means of wool attached to a sterile glass rod, which it is convenient to keep in a sterile test-tube of about 7 inches in length; broth is now inoculated by cutting off the wool end of the glass rod with a sterile file and dropping it in. This is incubated for twelve to eighteen hours; a slide is then made and stained, and plates of suitable media are inoculated. For streptococcus, bacillus coli, and bacillus pyocyaneus, Rowlands finds the media suggested by Captain S. R. Douglas to be excellent; one can thus isolate the organism and obtain pure cultures, if necessary by reinoculation. An eighteen hours' pure growth is now taken and made into an emulsion with a 0.5-per-cent solution of carbolic in saline solution. It is well broken up with a mechanical shaker and then counted. The next process is to submit the emulsion to heat in a steam bath at 55° C. for forty minutes; it is then stored in rubber-capped sterilized bottles and diluted as required.

The dosage is a matter that greatly depends on the type of case as well as on individual features in the patient, such as age; in old people one has to be more careful to avoid unpleasant reactions. In fairly acute cases Rowlands makes a plan of beginning with a dose of five millions if the organism is a streptococcus, pneumococcus, or diphtheroid bacillus, the dose being increased according to the reaction. With the bacillus coli he begins with ten millions in acute cases, and in the chronic cases, on the other hand, he begins with five times these doses.

The reaction may be one of three kinds —local, arthritic, and constitutional. The local reaction at the site of inoculation may be severe, especially in the case of the bacillus coli; usually it is little more than a slight inflammation and itching of the skin. The arthritic reaction is important as being the chief guide to subsequent doses employed. Rowlands always aims at bringing about a slight exacerbation of the joint symptoms, such as swelling, heat, and pain. If the patient is kept at rest this soon subsides, as a rule within a few days, but should there be much pain a local application of ice gives relief; when this subsidence has occurred the patient usually reports marked improvement. The next dose following a rather acute reaction should not be increased and there should be no great reaction. Following this the dose may now be increased until one has reached the following numbers: bacillus coli, and paratyphoid, two hundred millions; pneumococcus, streptococcus, pyocyaneus, and diphtheroid bacilli, fifty millions. There should be an interval of from seven to ten days between the injections, and when there is very marked improvement this may be in-

creased to fourteen or twenty-one days; the treatment should be continued for at least a year, and if possible the injection should be given in the evenings. Some constitutional reaction may be complained of by a few patients; it consists of a general feeling of malaise, slight headache, sickness, palpitation, perhaps a rise of temperature with a slight rigor. The last-named symptom Rowlands has generally seen in cases inoculated with a vaccine of bacillus coli.

The usual forms of treatment should be administered simultaneously with the vaccine therapy, including attention to the general condition, removal to a bracing climate if possible, massage, baths, tonics, and removal of sources of worry; but, as has been remarked above, none of these will cure the malady unless the cause of it is treated at the same time, and this means the removal of the septic focus, supplemented with specific vaccine therapy. If full advantage is taken of the measure now at our disposal Rowlands ventures to suggest that rheumatoid arthritis will lose most of its present terrors.

MANAGEMENT OF GONORRHEAL ULCERATION OF THE CORNEA.

In the *Southwest Journal of Medicine and Surgery* for January, 1916, GIFFORD says that when ulceration of the cornea occurs in this disease, the most important indication is to use as vigorous measures as are safe, to cure the conjunctival infection. No matter what application is made to the ulcer it is apt to spread until the discharge is checked; and conversely, if the discharge is checked the ulceration is apt to stop without any special treatment. Nevertheless, in addition to using 8 per cent silver, it is well to apply trichloracetic acid or tincture of iodine thoroughly to the ulcer; and if in spite of this it continues to spread, Gifford makes a paracentesis through the center of the ulcer; or, in specially bad cases, he does a keratotomy, not across the center of the ulcer as in the Saemisch cut, but through the healthy tissue at the central margin of the ulcer.

He has found such a cut to be a very effective bar to the progress of any bad ulcer; the reason probably being that like all corneal wounds it is rapidly filled with a plug of new epithelium, which offers a much greater resistance to the infection than does the corneal stroma. This may be in line with the incisions that are recommended by some men to head off erysipelas.

He has a prejudice against the cautery in gonorrheal ulcers. In the few cases in which he has used it he has received the impression that the eschar forms a favorable starting-point for reinfection. Besides the common form of gonorrheal ulcer, which starts in the center of the lower quadrant, he has seen a few cases of marginal ulceration. In one of these a very narrow linear ulcer, which on his first visit seemed rather insignificant, progressed so rapidly that after twenty-four hours practically the entire cornea was necrotic. These ulcers sometimes get started under the overhanging chemotic conjunctiva; so that where the margin is concealed for more than a day or two by such chemosis the conjunctiva should be pulled back, or if necessary dissected back, in order to allow careful inspection of the whole margin. In one case with such an ulcer Gifford believes he saved the eye by actually cutting away quite a large chunk of the dropsical conjunctiva. If he were to see another marginal ulcer, he believes he should treat it by the method of Aubaret, which consists in dissecting the swollen conjunctiva back from the cornea for a quarter of an inch or so, and after treating the ulcer with some form of cauterization allow the raw surface of the conjunctiva to slide over the cornea, which it does by virtue of its dropsical condition. This appeals to him strongly as it brings a raw, well-nourished surface to the aid of the non-vascular cornea, according to the principles first advocated by Kuhnt. Indeed, the method may well be used in all gonorrheal ulcers, a stitch or two being added if necessary to bring the conjunctiva well over the ulcer. The great objection to the ordinary Kuhnt

method of stitching the conjunctiva over all kinds of ulcers is that one does not feel sure of what is going on under the conjunctival flap, but with the chemotic conjunctiva of gonorrheal conjunctivitis the stitch can be tied loosely and untied so that the ulcer can be inspected as often as desired.

A word as to prophylaxis. Where a patient comes to Gifford with only one eye affected, he, of course, seals up the other as promptly as possible; but it has always seemed to him that before doing this we ought to take into consideration the fact that the second eye, although it shows no sign of inflammation, may actually have been infected a short time beforehand. Granting this, it would seem to follow logically that before covering the eye we should take the same precautions that we would with a new-born infant's eyes in a suspicious case.

As to the method of applying the protective watch-glass, the original method of Buller, according to which the watch-glass is included between the layers of gauze, which are then fastened to the skin, is much more troublesome and less secure than if the watch-glass is pasted directly onto the skin with a very thin layer of cotton and collodion. If a watch-glass doesn't happen to be at hand, a temporary shield can be made of pasteboard, or by stiffening an arched layer of cotton with collodion and cutting two or three small holes in the center.

In conclusion, Gifford trusts he will be excused if he takes a short excursion into the unknown, and makes some suggestions as to the treatment of gonorrheal ophthalmia, the practical utility of which he has not yet tested. Starting with the fact that the great majority of ophthalmologists occasionally lose an eye in spite of all that they can do, and that this loss is occasioned by the persistent contact of the gonorrheal discharge with the cornea, and adding to this the fact that the cure of the infection is delayed and the danger to the cornea prolonged because we fear to use remedies as strong as is necessary, it can readily be seen that if we adopt some measure which will actually keep both the discharge and any remedies which may be used from coming into contact with the cornea, we shall have made a long step toward the solution of the problem. For some time Gifford has been experimenting to find an easy and practical method for accomplishing this end. He has tried disks of rubber tissue thinly coated with vaselin, but these were too easily displaced. The idea of using the Thiersch flap for this purpose he has tried on the rabbit, but a graft taken from himself proved to act as a foreign body, and he found it practically impossible to get a suitable autograft from the rabbit.

Some years ago Goldzieher, of Budapest, proposed covering the entire cornea with two conjunctival flaps which he dissected loose by vertical incisions at each side of the cornea and then transposed them; so that the right flap was applied to the left side of the cornea and the adjacent sclera and the left flap to the right side. Not having seen his paper in the original, Gifford does not know whether Goldzieher designed this method for the purpose of curing corneal ulcers or for preventing them. If it was the latter, he is entitled to priority for what Gifford considers a most fertile idea. Just why it should be necessary to use so complicated a method Gifford does not understand. If sutures are to be used at all, it seems as if the ordinary purse-string suture or three side-to-side mattress sutures would answer just as well. He is still inclined to favor a Thiersch flap covering, as it avoids the necessity of sutures and can be renewed daily if desired, with very little trouble; but waiving this point, Gifford would suggest as the most rational abortive treatment for gonorrheal ophthalmia the following:

A free application of 1-per-cent silver nitrate is first made to the conjunctiva and the sac thoroughly washed out, and the edges of the lids and surrounding skin carefully wiped to temporarily clear the field of germs. Then, the conjunctiva having been dissected loose around the cornea, the latter is protected either by a Thiersch flap

with the edges tucked under the conjunctiva or by drawing the latter over the cornea by a purse-string or mattress suture. Then with the reclining patient looking sharply up, while the upper lid is held well away from the globe (by hooks or by sutures if necessary) the upper cul-de-sac is filled with 4-per-cent silver nitrate and is deliberately but gently swabbed until it is certain that the solution has reached every fold and cranny. This is then syringed out and the lower cul-de-sac treated in the same way. The same solution is then injected into each canaliculus and is applied to the edges of the lids, the lashes, and the surrounding skin. Repeat every twelve hours until the infectious discharge stops. If the cure is not complete after two or three applications, use 8-per-cent silver in the same way. Whether strong silver, 20- to 50-per-cent protargol, 10-per-cent permanganate of potash, or something else may prove to be best is immaterial; the point is that in this way the remedy can be used with such freedom that Gifford believes two or three days will suffice for a cure, and that meanwhile the cornea will be protected from the action of the discharge. This, of course, is only a dream, but it may well be that some one will realize it before he has a chance.

SERUM SICKNESS IN A SERIES OF FIVE HUNDRED PATIENTS TREATED WITH DIPHTHERIA ANTITOXIN.

In the *Archives of Internal Medicine* of January 15, 1916, STURTEVANT reaches these conclusions:

1. A varying proportion of patients receiving modified horse serum react with rash and other symptoms. The larger the amount of serum the larger the number reacting.

2. Most patients react from the fifth to the ninth day, though reaction may take place from the first to the seventeenth day and perhaps later. The time of reaction has no relation to dosage.

3. Rash may be erythematous or urticarial. The larger the dose the greater is the proportion of urticarial rashes. Vesicular urticaria is sometimes, though rarely, seen.

4. Nausea and vomiting occurs in about one in five reacting cases. It is more likely to occur and to be severe and prolonged if the dose of serum is increased.

5. Albuminuria and edema occur occasionally, either together or independently.

6. Joint symptoms occur in about 14 per cent of reacting cases and may be severe.

7. If a given amount of serum be given in two or more doses, it seems not less likely to produce reaction than if given in one injection.

HYPERTHYROIDISM.

MARSHALL in *Northwest Medicine* for January, 1916, makes the following observations:

1. Hyperthyroidism is a condition in which the secretion of the thyroid is quantitatively increased or qualitatively altered, or possibly both conditions exist. It is divisible into low-grade hyperthyroidism, in which parenchymatous degenerations predominate over the toxic functional disturbances, and high-grade hyperthyroidism, in which the toxic disturbances predominate.

2. The diagnosis is made by being thoroughly conversant with the symptoms which may be dependent upon a hyperactive thyroid. The most common error is to overlook hyperthyroidism in cases diagnosed as functional heart disease, hysteria, and neurasthenia, and to fail to appreciate the rôle hyperthyroidism has played in the causation of heart, kidney, and liver degeneration.

3. All cases should first be treated medically, and if improvement begins and continues satisfactorily, it should be persisted in. If improvement does not begin, progresses unusually slowly, or acute exacerbation occurs without omission of some important element of treatment, it should be treated surgically. The patient should not be sent to a hospital one day and a thyroidectomy done the next. All cases should be improved as much as possible by medical

treatment before surgery is done. If the case be very severe, preliminary ligation of one or both sets of thyroid vessels should be done, with thyroidectomy at a later date.

SALICYL IN BLOOD AND JOINT FLUID OF INDIVIDUALS RECEIVING FULL THERAPEUTIC DOSES OF SALICYLATE.

In the *Journal of Pharmacology and Experimental Therapeutics* for February, 1916, SCOTT, THOBURN, and HANZLIK state that the percentage concentration of salicyl in the blood and joint fluid of rheumatic individuals receiving full therapeutic doses of salicylate is approximately the same.

There is no demonstrable free salicylic acid in the joint fluid of individuals suffering with rheumatic fever.

THE EFFECTS OF PROLONGED FEEDING OF ALUMINUM SALTS.

In the *Journal of Pharmacology and Experimental Therapeutics* for February, 1916, ROTH and VOEGTLIN state that when the aluminum, in the form of aluminum lactate or sodium aluminum lactate, is fed to rabbits, cats, or dogs for long periods of time, certain distinct effects are produced. Rabbits which received by stomach-tube the equivalent of 20 mgm. of aluminum per day died after about two months. The only symptom which they manifested was diarrhea. At autopsy corrosion of the stomach, together with congestion, and a hemorrhagic condition of the intestinal mucosa were found. If the daily doses were increased to 80 mgm. there usually resulted besides diarrhea some loss in weight and certain urinary changes, namely albuminuria, accompanied by many hyaline and granular casts. At autopsy the animals which received 80 mgm. per day showed numerous areas of intestinal hemorrhages and a few areas of ulceration, which were especially marked in the large intestine.

Cats which received aluminum lactate as a 10-per-cent aqueous solution by stomach-tube in daily doses varying from 40 to 80 mgm. died after three to seventeen days. When given in this way, vomiting occurred on the first or second day and continued at irregular intervals until the death of the animal. The desire for food, while not wholly lost, was greatly decreased, and all the animals lost in weight. Shortly before death albuminuria appeared. At autopsy varying degrees of corrosion of the stomach mucosa and congestion of the upper part of the small intestines were generally found, while in some animals the spleen, liver, and kidneys were also congested. Two cats that were given aluminum lactate in milk in 20- to 40-mgm. doses for a period of about eight weeks seldom vomited after receiving the mixture and showed alternating periods of diarrhea and constipation. At the end of seven weeks the animal which received the 40-mgm. dose developed a slight albuminuria, and at autopsy showed changes similar to those occurring in dogs.

In dogs daily doses of 20 mgm. of aluminum lactate for periods of four months produced diarrhea only. At autopsy, however, congestion and scattered hemorrhages were found in the stomach, while the intestines showed not only congestion but many areas of minute hemorrhages and thickening of the intestinal mucosa.

THE INTRASPINAL TREATMENT OF SYPHILIS OF THE CENTRAL NERVOUS SYSTEM, ACCORDING TO THE METHOD OF SWIFT AND ELLIS.

In the *Archives of Internal Medicine* of January 15, 1916, DEXTER and CUMMER state that the results in six of these ten cases have been a symptomatic improvement so emphatic that the patients' economic efficiency has been resored. They are able to work and to enjoy life to all intents and purposes as normal individuals.

The writers feel that the best results will be obtained in cerebrospinal lues, and in tabes of the early or moderately advanced types. In far-advanced tabes the results are in most cases dubious to say the least. Their own experience with paresis is so

limited that they should have no right to make any generalizations. It seems probable to them, however, that very little can be done to improve permanently a paresis once it is well established.

In concluding they feel that they can state fairly that the Swift-Ellis method is safe when the original technique is followed out to the letter. The claim of the originators that it is a valuable adjunct to the treatment of syphilitic involvement of the central nervous system is sustained as far as dorsal and cerebrospinal syphilis are concerned. It is a method which is not essential in all cases, but which applied carefully and controlled intelligently will bring about definite amelioration in symptoms and in laboratory signs where other accepted modes of attack have failed.

MERCURY ELIMINATION IN BICHLORIDE POISONING.

VOGEL and LEE in the *Medical Record* of January 8, 1916, state that:

1. The elimination of mercury in cases of acute bichloride poisoning may continue from periods of time ranging from a week to several months, and treatment should be continued until it has been shown that elimination of the drug is ceasing. The excretion usually continues longest from the bowel, and systematic flushing of the large intestine should always be carried out, but the gastric mucosa and the skin are also important as channels of elimination and should be utilized in order to spare the renal epithelium.

2. A considerable leucocytosis with an absolute and relative increase in the polynuclear cells is practically always present.

HYPOTHYROIDISM.

In *Northwest Medicine* for January, 1916, BROWN points out that true myxedema is a rare disease, but mild thyroid deficiency is very common, especially in the Puget Sound country, as shown by the large number of compensatory goitres one sees daily. The diagnosis of myxedema is easy, but milder deficiencies, causing, however, serious breaks in health, are very much more common than one would suppose.

As a general guide one should be suspicious of thyroid insufficiency on the following objective symptoms:

1. Obesity with pasty, anemic appearance, especially in children and in young adults.

2. A dry skin and scanty perspiration even on exertion. The skin is hard, board-like, and does not pit on pressure.

3. Brittle hair and finger-nails. The hair is scanty. The hair of the outer third of the eyebrow is often absent.

4. The heart action is as a rule slow and blood-pressure is sometimes quite low. A high blood-pressure is, however, not uncommon in cases of long standing.

5. Albuminuria and scanty urine with high specific gravity but low urea content is quite common.

6. Scanty, irregular, and suppressed or painful menstruation is a very common disorder, due to poor functioning of thyroid gland. The opposite, menorrhagia, is also common in obese young women.

7. Subjectively the symptoms are quite as varied. Enuresis nocturna in children is often due to hypothyroidism.

8. Muscular weakness, inability to sustain long and severe mental or physical effort, and sensitiveness to temperature changes are quite marked. Headaches, neuralgias, and especially the variety known as sick-headaches, are almost characteristic of this disorder. Psychical disturbances are not uncommon.

9. Backwardness in children, especially of walking and talking.

10. Enlarged tonsils and adenoids are not infrequently associated with hypothyroidism.

11. Skin eruptions of the eczema type are not uncommon and are exceedingly stubborn, unless the true cause is recognized.

12. The facial expression should be noted. The complexion is often of a pinkish-yellow hue, which Hertoghe considers of great value in making a diagnosis.

COMMON AFFECTIONS OF THE EYE.

In the *New York Medical Journal* of January 22, 1916, RISLEY says that one of the commonly occurring forms of disease with which we meet is phlyctenular ophthalmia, usually occurring in early childhood. The differential diagnosis is important since it may be mistaken for the catarrhal types of conjunctival disease, from which it differs widely as to symptoms, etiology, and the treatment required. It is differentiated from catarrhal conjunctivitis by the nature of the discharge and by the appearance of the conjunctiva. In infectious catarrh that membrane rapidly becomes opaque, red, and velvety, and the discharge is purulent or mucopurulent; there is very little or no photophobia or pain. In phlyctenular disease, on the other hand, the conjunctiva may be somewhat edematous, but remains transparent, and is often covered profusely with isolated elevated points or phlyctenulæ; or there may be, and usually is, a chain of larger phlyctenulæ along the limbus of the cornea, or the cornea itself may have one or more of these phlyctenulæ on its surface with or without a leash of vessels approaching it from the corneal limbus. The mucous membranes covering the soft palate and arches are also covered with phlyctenulæ, suggesting the systemic character of the disease. There is distressing photophobia, and profuse discharge of tears with excess of mucus floating in them. Pain is not a marked feature. The cases of phlyctenular disease, for the most part, belong to two distinct types, differentiated by their etiology. The older writers classified this disease as scrofulous or strumous ophthalmia.

In one group of cases the disease is habitually associated with, if not absolutely dependent upon, alimentary disturbance. The eye trouble may be regarded as a local expression of a general toxemia, the origin of which is in the alimentary canal. They are rebellious to all local treatment, but recover rapidly under alkaline washes, atropine, and dusting with calomel or bismuth powder, as soon as the digestive troubles are relieved by suitable treatment and a wisely regulated diet and general regimen.

Another group, which to the casual observer may, so far as local expression is concerned, seem in all respects similar, are nevertheless essentially different. Notwithstanding all the above suggested treatment they do not tend to recover, but to grow worse. The phlyctenulæ become open ulcers along the border of the cornea, there are gray isolated nests of opacity on the cornea, or on the membrane of Decimet, especially at the angle of the anterior chamber; the appetite is precarious, the child is pale, ill nourished, and the lymphatics are enlarged. Under corrected regimen, life in the country, iodide of iron and arsenic, cod-liver oil, etc., they make partial recovery, but soon relapse. These cases form a numerous group, and we now know they are due to tuberculous infection and tend to permanent recovery only under treatment addressed to relief from the specific infection.

Foreign bodies lodged in the cornea, simple as they may seem, are fraught with peril. The eye should first be flushed with a sterile unirritating wash, followed by a few drops of a sterile cocaine or holocaine solution, and the foreign body removed. This can often be done by a small pledget of cotton wrapped tightly on the fine point of a steel probe, slight lateral pressure being sufficient to dislodge the foreign body, when the eye should again be flushed with a suitable wash. When too firmly embedded for removal by this simple procedure, a small steel spud, or the point of a secondary cataract knife, may be cautiously placed under the foreign substance to lift it from its bed. But the possibility of infection, either from the foreign substance being impure, or by the contents of the conjunctival sac, which is rarely free from microörganisms, should always be borne in mind and carefully guarded against. If the patient is restless, or the foreign body is deeply embedded in the firm tissue of the cornea, it is not always possible to avoid the destruction of a considerable area of

corneal epithelium. Under these conditions it is often wise, after thorough flushing of the denuded surface, to apply a bandage firmly over the closed lids. This prevents the movement of the lids over the uncovered surface and exposed corneal nerves and so avoids discomfort for the patient, is security against infection, and gives opportunity for rapid replacement or repair of epithelium over the denuded area. If, in spite of these precautions, infection supervenes and corneal ulceration occurs, vigorous treatment should be begun at once. Judicious cauterization is the surest method of arresting its advance. Risley's own preference is for the well-controlled application of trichloracetic acid. A convenient and safe method is to dip the fine point of an orange-wood stick into a saturated solution of the acid and apply it lightly to the ulcer, which should be freed from moisture by absorbent cotton to prevent diffusion of the acid to the surrounding corneal surface. The previous instillation of a few drops of a two-per-cent holocaine solution makes the procedure painless.

SIMPLE GUIDES FOR THE ARTIFICIAL FEEDING OF INFANTS.

The *New York Medical Journal* of January 1, 1916, contains an article by EDELMAN in which he says that the quantities of the various elements to be used are as follows:

Proteins. Allen and Grulee have shown that the amount of protein contained in one ounce of milk is required to each pound of weight of the infant in twenty-four hours to maintain a nitrogen equilibrium (that is, no gain), and in order that the infant may build up sufficient nitrogen in the tissues, the proteins must be one and a half ounces of milk for each pound in twenty-four hours. That is, an infant weighing ten pounds requires ten ounces of milk in twenty-four hours to maintain a nitrogen equilibrium or keep its weight, and fifteen ounces to store up nitrogen or make a gain.

Fat. The same is true of fat; it requires one and a half ounces of milk in twenty-four hours to the pound—that is, the infant, in order to gain, must have the fat contained in one and a half ounces of milk for every pound of its weight in twenty-four hours.

Sugar. An infant weighing below ten pounds requires one ounce of sugar in twenty-four hours. An infant weighing above ten pounds requires one and a half ounces of sugar in twenty-four hours. Edelman never gives more than two ounces in twenty-four hours. When giving sugar for the first time, or after any nutritional disturbance, he never gives the required amount, but he starts with a teaspoonful and increases every day, or every other day, until he reaches the required amount; being guided by the infant's tolerance and the stools.

The foregoing guides give to the physician a simple method of using the various elements. It should be used as a barrier. To limit the formula as a whole, Edelman uses the caloric method. A calorie is the amount of heat required to raise the temperature of one kilo (2½ pounds) of water from zero to 1° C. It is a heat unit and is used as expressing a food value. With it we know exactly how much food to furnish the infant in twenty-four hours, with reference to its requirements and weight. But in order to ascertain the required calories, it is necessary to divide infants into three classes:

Class 1—Fat baby over five months, or an average baby at any age, requires 40 to 45 calories per pound in twenty-four hours.

Class 2—Average baby under four or five months, or a moderately thin baby at any age, requires 50 to 55 calories per pound in twenty-four hours.

Class 3—An emaciated baby at any age requires 60 to 65 calories per pound in twenty-four hours.

Bearing these three classes in mind, it is only necessary, when we see the infant, to place it in one of the classes. This can readily be done by inspection, palpation, and weighing of the infant. It is a very simple method to tell if a baby is normal, thin, or emaciated.

It may be asked, Why does an emaciated baby require more calories than a fat baby?

1. An emaciated baby cries and frets more, and uses more calories than a fat baby.

2. The amount of heat produced is in proportion to body surface—that is, the greater the skin surface, the more the heat produced. The skin surface of fat babies is the same as that of emaciated babies, therefore they produce the same amount of heat. We can readily see that the emaciated baby requires more calories to make up that heat, because its weight is less.

In order to make the formula according to the caloric method, it is necessary to know that one ounce of four-per-cent milk equals twenty calories, and one ounce of sugar by weight equals 120 calories.

As to the number of feedings in twenty-four hours, either two-, three-, or four-hour intervals are used. Edelman uses the three-hour interval in all babies who are not premature, and in the latter he uses a two-hour interval. If the three-hour interval is used, he gives food at 6 and 9 A.M. and 12 M., and at 3, 6, and 9 P.M., and again at 2 A.M., until six months of age. If the two-hour interval is used, he has ten feedings. The four-hour interval, he must admit, he has not as yet given a thorough trial, for in dispensary practice it is impossible to have the mothers carry it out.

The quantity to give an infant at each feeding is determined by the following rule: Give one or two ounces more at each feeding than the number of months in the baby's age; never less than three ounces, and never more than eight ounces. Experiments have shown that an infant one week old can take three ounces every three hours, with good results, and Edelman's experience bears it out. The reason is that the liquid portion of the milk passes into the intestine immediately, and the solid portion of the milk takes from three to three and a half hours to pass through. The liquid portion makes up about three-quarters of the milk and the solid portion makes up the other quarter.

The rule for the diluent of the milk. That depends upon the number of feedings and the amount given at each feeding. Example: Baby three months old; the number of feedings according to the rule would be seven; amount to give at each feeding would be, according to the rule, from four to five ounces. We then multiply seven feedings times five ounces and we get thirty-five ounces of food for twenty-four hours. Therefore that infant requires thirty-five ounces of food in the twenty-four hours. If we now deduct the amount of milk we desire to use, we get the quantity of the diluent to be used. Having learned these guides, we can now proceed to feed our baby.

Example: Baby A., six months old, weighs 15 pounds, stools normal. This baby belongs to the first class, forty to forty-five calories, and according to the rules requires six feedings (after five months); no night feeding. The amount at each feeding in this baby would be seven to eight ounces (one to two ounces more than the baby's age).

Protein and fat requirements would be fifteen pounds (the baby's weight) multiplied by one and a half ounces equals twenty-three ounces of milk required. The sugar required is one and a half ounces for the twenty-four hours (baby weighing over ten pounds). Total amount of food for the twenty-four hours would be six feedings, and eight ounces to each feeding; six times eight equals forty-eight ounces of food for twenty-four hours, including milk and diluent.

The weight of the baby is fifteen pounds. The calories necessary for each pound are forty to forty-five. The child requires fifteen times forty-five calories, equals 675 calories; this child requires food for twenty-four hours amounting to 675 calories. From this amount we must deduct the calories for the sugar to ascertain the amount of milk and diluent required, one and a half ounces of sugar times 120 calories per ounce of sugar equals 180 calories. Subtract 180 from 675 equals 495 calories to be made from the milk. We divide 495 by twenty (because there are

twenty calories to each ounce of milk), equals about twenty-four ounces. This entire formula of forty-eight ounces requires twenty-four ounces of milk, and therefore leaves twenty-four ounces for the diluent (in this case boiled water) and one and a half ounces of sugar (here cane-sugar because this is a normal baby). Our formula for this baby would consist of twenty-four ounces whole milk, twenty-four ounces of water (boiled for three minutes), and one and a half ounces of cane-sugar, to be divided into six bottles of eight ounces each, to be given at 6 and 9 A.M. and 12 M., and 3, 6, and 9 P.M.

This, to Edelman's mind, is the simplest and most successful method of artificial infant feeding we have to-day. For the method he is indebted to his chief, Dr. R. Dennet.

PHYSIOLOGY OF THE PITUITARY GLAND AND THE ACTIONS OF ITS EXTRACTS.

In the *Lancet-Clinic* of January 8, 1916, CADWALLADER reminds us that pituitrin, which is obtained from the pituitary gland, is being very generally used, and especially in obstetrics. As it has never been formally presented to the Cincinnati Obstetrical Society, he thought a brief review of its action and use might prove of benefit. Upon inquiry among a number of general practitioners, he found that they are using it rather promiscuously and citing no bad results, but much aid, in their obstetrical cases. From one of his fellow doctors, for whom Cadwallader has much regard for his deductions and ability, he begs leave to quote the following letter, which, upon request, was given to him:

"I have used pituitrin over a period of five years and consider it a very valuable aid in my obstetrical work. My forceps cases have been reduced 75 per cent since I have used it. I have never had any fatalities in the use of it, but have noticed that the babies are at times cyanosed. While this might seem a drawback to the use of the drug, we must remember that this condition with possible bruises and tears is liable to occur with the use of forceps. I had one patient on whom I had used this preparation develop spasms immediately after delivery of the placenta. No albumin in the urine, but the spasm lasted about ten minutes. I delivered her of a child once before and once afterwards without the use of pituitrin, and patient was absolutely free from any pathological symptoms."

THE TREATMENT OF NEPHRITIS.

In the *Boston Medical and Surgical Journal* of January 20, 1916, PHIPPS reaches these conclusions:

1. Any rigorous system of diet may be (but should not be) so strict or continued so long as to make it distinctly harmful to the individual case.

2. More freedom in the allowance of protein than is recommended in the "text-book" nephritic diet may be of apparently great advantage in the individual case.

3. Thyroid extract has, perhaps, a great value in the treatment of nephritis, one of the commonest and, at the same time, one of our most hopeless diseases.

4. If given carefully, the administration of the drug is safe.

5. Thyroid medication in nephritis should receive more attention than has heretofore been accorded it.

THE TREATMENT OF ALOPECIA AREATA.

In the *Journal of the Missouri State Medical Association* for January, 1916, SUTTON tells us that of the various constitutional remedies that have been recommended, none is specific. Arsenic, iron, cod-liver oil, and the similar tonics are indicated, should the patient's general health be below par. Believing, as he does, that the disorder is essentially due to ganglionic injury, following trauma or infection, he has, during the past four years, prescribed hexamethylenamine as a routine measure in all his alopecia areata cases. The dosage varies, but the majority of patients can comfortably take from 5 to 10 grains (0.3 to

0.6 gm.) in plentiful amounts of water, after each meal for considerable periods of time. If there is any resulting vesical irritation the remedy should be withdrawn for a few days and then its use gradually resumed. Sutton believes the drug exerts a favorable influence in the majority of instances. At any rate, his results have been far more satisfactory since its adoption than before. Locally, stimulating applications are the most valuable. The majority of those recommended are antiseptic as well as irritating, but in the selection of a remedy its bactericidal properties are of secondary importance. The list includes a wide variety of drugs—tar, mercuric chloride or iodide, chrysarobin, beta-naphthol, croton oil, aqua ammonia, tincture of cantharides, trikresol, and phenol.

Of these various agents, phenol (95 per cent), as originally recommended by Bulkley, has proved the most efficient in Sutton's hands. The remedy may be applied full strength to bald patches on the scalp and eyebrows, but should be diluted one-half with glycerin when treating lesions on the face. It may be painted on twice weekly, care being taken to avoid covering too large an area, not more than 50 square centimeters at one time. He prefers to apply only a thin film, and allow it to remain on the skin, but many authorities recommend that the phenol be immediately followed by liberal applications of ethyl alcohol.

In addition to this local irritant, he generally prescribes a stimulating tonic, such as mercuric chloride dissolved in alcohol, mainly for the purpose of stimulating the growth of the hair and eradicating any lesions of seborrheic dermatitis that may be present. The following mixture has proved very satisfactory in his hands:

> Mercuric chloride, gr. 1/6;
> Chloral hydrate, drachm ij;
> Spirits of formic acid, drachm iv;
> Castor oil, min. v;
> Alcohol (80 per cent), q.s. ounce vj;
> Oil of bergamot to perfume.
>
> M. et sig.: Shake, and apply to scalp at night.

An occasional massage is helpful, principally as a circulatory stimulant. The main dependence, however, is to be placed on the hexamethylenamine and phenol. If these are employed methodically and persistently, recovery will result in the majority of instances.

EPISIOTOMY.

In the *Boston Medical and Surgical Journal* of December 23, 1915, WILLIAMS in an article dealing with this topic reaches these conclusions:

1. Episiotomy is a procedure of definite value.

2. Properly used, it should practically eliminate complete laceration of the perineum from gynecology.

3. It should not be performed except to prevent a complete tear, because incomplete perineal tears heal as well as the episiotomy wound and are less difficult to suture.

4. Complete lacerations of the perineum are especially to be feared in: (*a*) Contractions of the inferior strait. (*b*) Rigid perineum, as in late primigravidæ. (*c*) Short perineum. (*d*) Unusual size of fetal head. (*e*) Aftercoming head in breech presentation. (*f*) Face presentations.

NOTES ON THE TREATMENT OF DIARRHEA AND DYSENTERY.

In the *Journal of the Royal Army Medical Corps* for November, 1915, BALFOUR gives this advice:

1. *Diarrhea.* The following remarks apply not only to simple irritative diarrhea, but to the early diarrheal stages of all forms of dysentery.

A case seen right at the beginning should at once be given one ounce of castor oil. If colic is present ten drops of tincture of opium should be added to the oil. This treatment alone, with rest, warmth, and suitable dietary, will often check the condition. It may frequently with advantage be followed by one-drachm doses of castor oil in an emulsion given every four or six hours for twenty-four hours. At the same time, having regard to the difficulties in coming to an exact bacteriological diag-

nosis, emetine should be administered intramuscularly or intracellularly from the outset in the dose already recommended by Sir Ronald Ross, namely, two-thirds of a grain once or twice a day.

In severe cases which show every sign (colic, tenesmus, rise of temperature) of passing on into a true dysentery there should be no hesitation in giving a large dose of emetine. As much as 2 or even 3 grains daily, say in ½-grain doses every four hours, may be administered so long as it is tolerated by the patient. The smaller dose will, however, generally suffice. Intolerance is usually shown by nausea and a tendency to collapse. Salivation may also be present. So far as is at present known there is little or no risk of a cumulative effect.

If the castor oil fails after fair trial it is well to have immediate recourse to the salines. The following prescription is useful:

Sodii sulphat., gr. lx;
Acid. sulph. aromat., min. xv;
Tinct. zingiberi, min. vijss;
Aq. menth. pip., oz. j.

It may be given every two, three, or four hours, according to the severity of the case, and should be continued until the stools become watery. Sodium sulphate is on the whole preferable to the magnesium salt.

Note.—It would seem that calomel has not been so successful in the treatment of diarrhea amongst the troops as the measures above indicated. Opium may be necessary if there is much griping, but it is better avoided after the initial dose given along with the castor oil.

2. *Amebic Dysentery.* (1) Acute. When the bacteriologist pronounces the case to be due to Entamœba histolytica infection, or when the symptoms (character of stools, course of the temperature, etc.) point to the entamebæ being the cause, it is necessary to continue the emetine treatment energetically.

A dose of one grain given once or at the most twice a day, and preferably by the needle deep into the outer portion of the forearm, after careful skin sterilization is usually ample, but it must be remembered that emetine acts by killing the causative entamebæ and preventing the formation of their infective cysts, and that emetine alone will not cure the ulcerative colitis which is speedily established in a case of amebic dysentery, nor has it any effect upon the secondary septic absorption which so often occurs. Hence to rely wholly on the emetine treatment is in many cases a mistake unless, indeed, it is instituted at the commencement of the illness, when it usually suffices.

Local treatment of the bowel is, therefore, indicated in all save mild and trivial attacks. For this purpose the saline mixture mentioned under diarrhea should be continued four-hourly at first, and if necessary pressed; while washing out the lower bowel night and morning with a plain warm saline solution, administered by means of a douche can, is very sound and often affords great relief. The saline treatment also washes away amebic cysts, and by its scouring action on the intestinal epithelium may possibly enable the emetine to act on deep-seated cyst-producing entamebæ. Care should be taken that the nozzle used is sterilized after use, as infection has been conveyed by this means. Later on, when blood has disappeared from the stools but mucus still persists, daily enemata of tannin and quinine should be substituted. The lavage must be performed carefully and slowly, and continued until the intestinal effluent returns almost clear.

Dissolve 150 grains of tannin and 15 grains of quinine hydrochloride in a liter (1¾ pints) of warm water. If painful, half-strength may be employed.

Tannin alone, 0.5 to 1.0 per cent, may be used. Calcium permanganate, 6 grains or more to the pint, is an alternative solution. A sedative enema which may be tried with advantage consists of bismuth 2 drachms, tincture of opium 30 minims, and thin starch 2 ounces. When it can be managed an ounce of linseed soaked for several hours in 2 pints of warm water makes a soothing injection. A suppository of cocaine and morphine will frequently facili-

tate the administration of enemata and may also benefit spasms and tenesmus.

Sir James Crichton Browne has suggested that hypochlorous acid in the form of injections of "eusol" is worthy of trial combined with saline lavage. This will soon be generally available, and there are good grounds for adopting the suggestion, though such a line of treatment is perhaps more adapted for chronic cases.

In severe amebic dysentery emetine should be given intravenously. As much as one and a half grains can be injected daily dissolved in ten cubic centimeters of saline. Emetine may also be given by the mouth in keratin- or salol-coated pills taken at night on an empty stomach, but it is not so good when thus administered. In all cases diminish the emetine as the case improves. Thus, as a rule, the daily dose can soon be reduced to half a grain. It is well to carry on the treatment for a week or ten days, then to give a week's rest, and to start again if examination of the stools shows that a further continuance of the treatment is necessary. Another method is to give the daily dose for a week, and throughout the second week to inject the emetine on alternate days. Save for the purpose of getting rid of cysts it is rarely, if ever, necessary to continue the costly emetine treatment beyond a second course. If emetine is going to do good its beneficial action is quickly apparent. It is well to remember that emetine itself may, even in medicinal doses, produce diarrhea, and when used in the form of suppositories is said to have produced bloody stools. Hence, one should always ask oneself if a persistent diarrhea in a dysentery case taking emetine may not be due to the drug and not to the disease. Failing emetine, recourse must be had to the old ipecacuanha treatment, which Sandwith describes as follows:

"The patient is starved for four hours, say from 5 P.M.; at 8.45 P.M. a mustard plaster is applied to the epigastrium, the pillows are removed from beneath the patient's head, and 15 minims of laudanum in water are given to him. At 9 P.M. he has one dose of 30 grains of ipecacuanha, and to prevent vomiting he is kept absolutely at rest, the nurse being ordered to wipe his lips to prevent his swallowing saliva for at least three hours, when he is allowed a small drink. The next night, with similar precautions, he is given 25 grains of the drug, preceded by ten drops of laudanum. On the third night he takes 20 grains after five drops of laudanum. After this opium is no longer required, and the ipecacuanha is gradually reduced to 5 grains and kept there till the course has lasted a fortnight, when the patient will have taken altogether 145 grains. The patients submit willingly to possible vomiting and rigid rest and make up by day for rather sleepless nights."

The form of ipecacuanha containing emetine is, of course, indicated. It is useful to add one part of tannin to three of ipecacuanha. The dose may be divided amongst four cachets, which are taken at the same time and continued daily for three days, then being gradually diminished.

During convalescence salicylate of bismuth should be employed if diarrhea persists. Some employ bismuth in large doses either as the subnitrate or salicylate along with emetine throughout the illness, but so far as recent experience goes the saline treatment seems to be preferable.

In all severe cases the tendency to heart failure should be remembered, and the value of hypodermic injections of camphor in this condition recalled.

(2) Chronic. Here local treatment is most useful. "Eusol" injections may be tried. So may large enemata of copper sulphate 1 in 1000, or nitrate of silver with opium and starch. It does not appear necessary to enter fully into this question as but little that is new or specially valuable has lately been advocated.

Note.—In every case of severe advanced amebic dysentery the stools should, whenever possible, be carefully washed and searched for sloughs, as their presence or absence forms a most useful guide to the course of the disease and may indicate the need of caution in giving injections by the bowel.

3. *Bacillary Dysentery.* (1) Acute. When the bacteriologist reports a case to be due to Bacillus dysenteriæ, or when the course of the disease (character of stools, course of temperature, etc.) points to invasion by a bacillus of the dysentery group, two lines of treatment have to be considered—that by specific polyvalent serum and that by salines.

Serum is now available, and there can be no doubt that in many cases it is of great value. The sooner it is given the better. The dose is twenty cubic centimeters by subcutaneous injection, and as a rule this is sufficient, but if necessary as much as sixty cubic centimeters may be given at the outset, or the above dose may be repeated.

If salines are employed the sodium sulphate mixture mentioned under amebic dysentery will be found to act well. As a rule it should be combined with simple lavage of the lower bowel.

In very bad cases drained by incessant evacuations, intravenous injection of saline on the lines introduced by Rogers for cholera will often save life, but it must be resorted to in good time. The special cholera outfit in two separate cases is now available and should be at hand for treating such cases of dysentery. Full directions are supplied with the outfit. An emergency injection consists of common salt 60 grains, carbonate of soda 60 grains, boiled water 1 quart. Give one to three quarts at a temperature of 100° F., carefully watching the effect. The danger of heart failure even at an early stage must be borne in mind.

(2) Chronic. Local treatment similar to that employed in chronic amebic dysentery is indicated, and, if available, the organic silver compounds, albargin (silver gelatose) 1 in 500, or protargol 1 in 100, should be accorded a trial. Here, again, "eusol" may find a useful field.

Enemata of olive oil sometimes prove very useful in this form of dysentery.

Note.—In cases of doubtful etiology there should be no hesitation in employing a combined therapy of emetine and polyvalent serum. In both forms of dysentery colic is benefited by turpentine stupes to the abdomen, while hemorrhage may be controlled by morphia or adrenalin hypodermically, calcium chloride or lactate by the mouth, or oil of turpentine in capsules.

4. *Flagellate Dysentery.* The only form which need here be considered at length is that due to Trichomonas hominis, for this is the only form of flagellate diarrhea or dysentery which has hitherto, so far as is known, been recognized amongst cases occurring in the Mediterranean Expeditionary Force. It cannot be recognized clinically, but may be suspected in cases of persistent diarrhea with bright yellow stools. In any case, the other forms due to Lamblia and Tetramitus cannot be very satisfactorily treated.

Trichomoniasis, however, though troublesome, can be dealt with as follows: In the early stages give an enema of an aqueous solution of iodine 1 in 1000. The water used need not be boiled as the iodine sterilizes it. Administer the injection slowly every evening for three consecutive days, giving one liter at a time. The iodine enema should be preceded by one of boiled water.

If the parasites persist a tablespoonful of the following mixture should be given every two hours for the first three days:

℞ Infus. cinchonæ (1 in 50, not acid), ounce ijss:
Ext. cinchonæ, drachm iij;
Tinct. cinnamomi, drachm v;
Syrup. opii (0.5 ext. in 1000), drachm iij;
Tinct. camph. co., drachm j;
Olei terebinth., m. xlviij;
with
Gummi acaciæ, drachm ss;
Aq. flor. aurant., drachm ss;
Aq. dest., drachm v;
Syrupi, drachm ij.

In addition the following enemata night and morning are indicated:

(a) 3½ pints of decoction of eucalyptus.
(b) 2 ounces of boiling water, yolk of an egg.
10 minims of laudanum.
15 minims of essence of turpentine.

This is Escomel's treatment, the essential of which is the exhibition of turpentine. It may be noted that for lambliasis the same author recommended calomel and aromatic castor oil.

SALVARSAN IN PRIMARY SYPHILIS.

In the *New York Medical Journal* of January 1, 1916, UHLE and MACKINNEY reach these conclusions as the result of clinical experience:

1. The earliest possible diagnosis of syphilis depends upon the demonstration of Treponema pallidum in the expressed serum of a suspected sore.

2. This examination is best made with the dark field illumination microscope.

3. The Wassermann reaction is of value in the diagnosis, as a positive reaction means the onset of systemic syphilis, while a negative reaction for practical purposes means a local infection only.

4. Experience teaches them that, when energetic salvarsan or neosalvarsan treatment is introduced before the advent of a positive Wassermann reaction, a radical cure is the rule.

5. After the Wassermann reaction is once positive, such uniformly good results cannot be expected.

6. When possible, excision of the chancre is a valuable addition to treatment.

RHEUMATISM AND SULPHUR.

We have recently received from Sir Lauder Brunton an extract of a paper he contributed to the *Lancet* of February 6, 1915. He says:

"In some cases, at least, of rheumatism, sulphur is an exceedingly useful antirheumatic. Many years ago, with the conceit born of ignorance, I considered the statement that powdered sulphur worn inside the stocking is a cure for rheumatism to be only an old wives' fable. I learned my mistake from a case which occurred in my own practice. I was seeing at fairly regular intervals for albuminuria a thoroughly skilled scientific chemist. One day the chemist asked me to prescribe for his wife, who was suffering from rheumatic pains in her hands which prevented her from sewing. This was to her a very serious matter, as she added much to their joint income by embroidering altar cloths and the like. I gave a prescription as requested, and at the next interview I asked the chemist how his wife was. 'Oh!' he said, 'she is quite well.' I was much pleased at this, and was taking the credit of the cure to myself, when the chemist told me that the medicine which I had given her had done her no good at all, but a friend had told her to powder the inside of her stockings with sulphur and wear them all night. In a short time this completely cured her, and her husband said the sulphur must have been absorbed through the skin of her legs, passed through her body, and been excreted by the skin of her arms, because her silver bangles became black. This remedy is simple, cheap, and easily applied, and might be useful in the case of the British soldiers. I hardly think it could do any harm whatever, though I have no experience of the effect of sulphur continuously applied to the skin for some weeks together, but, at any rate, I think it is worth a trial."

RECTAL AS A SUBSTITUTE FOR VAGINAL EXAMINATIONS IN LABOR.

HOLMES writes in the *Journal of the American Medical Association* of December 25, 1915, as follows:

1. The discovery of the possibilities of rectal examination in labor by Kroenig and Ries is one of the most important contributions to modern obstetric medicine of the last generation.

2. There must be a complete revision of the chapter on pelvic examination in obstetric text-books. Adequate presentation of the value of rectal examination must be stated. Vaginal examinations should be made subordinate to rectal touch.

3. While, at the present time, rectal examination does not give us the means of measuring pelvic size, it is of great value in estimating the factors situated in the posterior half of the bony pelvis.

4. In almost every direction, under appropriate conditions, rectal examination is as definite as vaginal, if combined with abdominal palpation.

5. The ease or difficulty of rectal examinations is commensurate to the ease

or difficulty which encompasses the vaginal ones, and is dependent on the same factors.

6. Rectal examination is an utterly innocuous precedure in labor, whereas vaginal examinations are always potential sources of infection to the woman.

7. Rectal examinations are peculiarly appropriate to those women who are to receive the test of labor in relatively contracted pelves when a Cæsarian section may possibly be needed.

8. Vaginal examinations should be made in labor only when, for some special reason, the rectal findings are indefinite or inconclusive.

9. The least that can be said of rectal examination is that it permits the conduct of normal labor with the essential elimination of vaginal examinations; a decided advance in the technique of the conduct of labor.

TREATMENT OF GASTRIC ULCER.

The *Official Bulletin of the Chicago Medical Society* of December 25, 1915, contains a summary of this subject by SMITHIES. He says that in considering the treatment of gastric ulcer the following fundamental facts should be remembered: (1) Gastric ulcer is usually a terminal phase of a systemic ailment, and is not a disease *sui generis*. Cure can be expected only after the removal of the underlying cause. (2) The primary cause is seldom due to alterations in gastric chemistry. (3) Changes in gastric chemistry are apparently secondary to existing ulceration. (4) Many gastric ulcers have a natural tendency to complete healing. The primary systemic fault should be searched for and eradicated. Foci of infection in the adenoids, about the teeth, or in the lymph-gland chains should be promptly removed. Intra-abdominal infections should also be eradicated. The removal of these germ centers is a fundamental step toward cure. Unless ulcers with much scar or causing gastric deformity are demonstrated to be luetic, medical measures promise little permanent relief. Frequently, so-called specific ulcer cures seem to bring about periodic stages of relief. Relief, however, does not mean cure. The disease often advances when under the most careful treatment. The danger of malignant change occurring in calloused ulcers should not be forgotten. It is agreed that calloused recurring ulcer in the pyloric half of the stomach should always be treated surgically. Excision should be done, when possible. If impracticable, then infolding, cautery puncture, with or without gastrojejunostomy, is best.

Cases to be treated medically should be carefully selected. The essential principles of medical treatment are: (1) Rest in bed, physical and mental. (2) Rest to the stomach itself. Avoidance of peristaltic waves. Irritating medicine should be avoided, as also gastric lavage and frequent local examinations. (3) The stomach should be kept nearly empty of food. The abstinence from food by mouth should continue for from three to seven days. The period is empirically determined. Paraffin wax may be chewed for fifteen minutes every two hours. Rectal feedings should be instituted: from 1000 to 1500 calories of nutrient mixture in twenty-four hours. A clyster containing alcohol, glucose, and normal salt solution is preferable. When mouth feeding is begun, small quantities of food should be frequently administered, to empty the stomach rapidly and keep it food-free for the longest time. This keeps down the hydrochloric or pepsin production to the minimum. Liquid carbohydrate mixtures are indicated. They call for the least amount of HCl and pepsin and impose the minimum of work upon the duodenum. The pylorus remains free from spasm and opens readily, and thus are avoided gastric stagnation and the accumulation of distressing acids. This limitation of acidity limits both the rate and strength of gastric peristalsis.

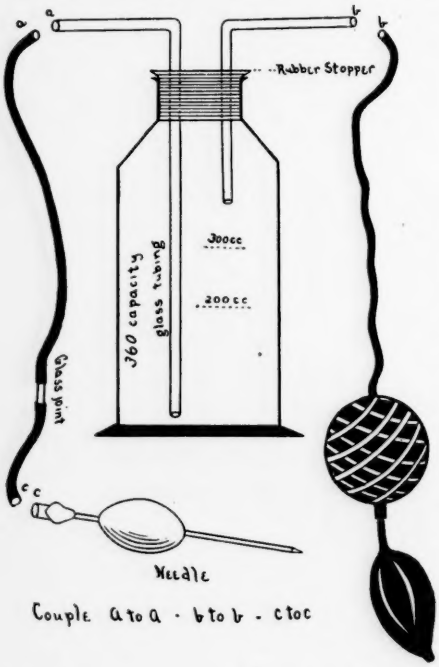
By observing the foregoing, large quantities of alkalies are usually unnecessary, as they tend to create pernicious increase of gastric acid and mucus. They also increase the alkalinity of the blood and stimulate the HCl secretion. Just enough alkali should be given to permit the duodenal contents to

be readily neutralized in order to rapidly empty the stomach through a relaxed pylorus. The excess of alkali acts as a foreign irritant.

A SALVARSAN APPARATUS.

DENNY states in the *Boston Medical and Surgical Journal* of December 23, 1915, that the accompanying sketch represents a useful and simple salvarsan apparatus which is much used in St. Paul, Minn.

It is reliable, practical, and simple; also



it is easily constructed by any one at small cost.

Take a wide-mouthed bottle of 360-Cc. capacity, fit it with a rubber stopper perforated for two glass tubes as you would a wash bottle.

Take 26 inches of rubber tubing to fit the glass tubes, cut it 18 inches from the end, and make a glass joint with the smaller cut end of the tube.

The long glass tube reaches to the bottom of the bottle and is to be connected with the rubber tubing, into the end of which the needle coupling is inserted.

The short glass tube is connected with a double bulb, such as is used with a thermocautery.

It is now ready for use after the salvarsan solution is poured in the bottle.

The stopper is fastened down by a wire or strips of plaster over the cork and around the neck of the bottle.

After the needle is inserted into the vein and the coupling is made, a few squeezes of the bulb are all that is necessary to force it slowly and steadily into the vein.

Care is taken not to allow air to enter the vein at the end of the injection.

The sketch renders more details unnecessary.

THE NUTRITIVE VALUE OF BOILED MILK.

The *American Journal of Diseases of Children* for January, 1916, contains a report by DANIELS and STUESSY on this subject. They claim that their results point to the conclusion that milk heated to the boiling temperature or thereabouts is an inadequate food. Rats fed on boiled milk grew to about half their normal size. Although they have been able to keep these experimental animals for many months on boiled milk, in no case have they got reproductions, nor have any of their animals reached the normal weight for adult rats.

Milk which is kept at the boiling temperature for forty-five minutes is no less efficient as a food than milk boiled for much shorter periods—ten minutes or one minute. The chemical changes which make milk an inadequate food are brought about at the boiling temperature or thereabouts. The value of pasteurized milk as a food, therefore, will depend on the temperature to which it is heated during the pasteurization process. Heating milk to a higher temperature than boiling (114° C.) makes it even less valuable as a food.

Although boiled cow's milk is an inadequate food for rats, it is apparently better borne than raw or pasteurized cow's milk, for they have been unable to raise young rats on either exclusively. However, rats fed both raw and pasteurized milk to which small amounts of meat extract were added

grew at the normal rate. The explanation of this lies, possibly, in the fact that the meat extract caused an increase in the digestive secretions, thus making the milk more available.

The advantage of using raw milk for infant feeding is obvious. When babies are unable to digest raw cow's milk, however, or there is danger that the milk may be contaminated, they believe that the pediatrist is justified in using boiled milk. When this is given, the mixture should have a higher protein content than when raw milk is used.

[Apparently these experiments do not prove that boiled milk is useless any more than they prove that raw milk is useless.—ED.]

A PRELIMINARY NOTE ON CHRONIC POISONING BY EMETINE.

The *British Medical Journal* of December 18, 1915, contains an article which has this title written by DALE. He says he was asked his opinion as to the possibility of producing symptoms of poisoning by the long-continued administration of emetine in individual harmless doses. Those who have had experience of the treatment of amebic dysentery with emetine have evidently been alive to the possibility of such a cumulative action. Dr. Low, for example, in a recent article in the *British Medical Journal* (Nov. 13, p. 715), mentions diarrhea, secondarily arising during treatment with emetine, as possibly caused by the alkaloid, and suggests that an unduly continued use of the latter in too high a dosage may eventually produce symptoms of intoxication. But there seems to be no certainty on the point, and little hope of attaining such by clinical observation alone, owing to the difficulty of deciding whether local effects on the alimentary canal, or more general effects of toxemia, are to be attributed to emetine, or to the condition which has led to its being administered.

On the other hand Dale failed to discover any record of direct uncomplicated experiment on the point. It was evidently desirable, therefore, that the matter should be put to the test of experiment on healthy animals. The investigation is still in its initial stage, but the indications that a cumulative action can be produced are already so positive that it seems desirable to make mention of the results even at this early period, in view of the practical importance of their implications.

At present Dale has made experiments only on a small number of cats and rabbits. The question as to what doses, in either of these species, can be regarded as physiologically equivalent to the doses normally employed in human therapeutics can only be answered by further experiment. Up to the present he has used a dosage which, in proportion to the weight of the subject, would be regarded as rather high for continued administration to man. If we take 65 kg. as the weight of an average man, a dose of one grain for such a patient is about 1 mg. per kilogramme. So that 5 mg. for a cat weighing 3 kg. corresponds to rather more than 1½ grains for the average man. This is the order of dosage with which he has experimented up to the present—individual hypodermic injections of 5 mg., or occasionally 10 mg., for animals of 2.5 to 3.5 kg. Such a dose, given once only, has no perceptible action of any kind on the animal, and it may be repeated daily, up to a point, without obvious effect. There is considerable individual variation in respect of the number of such daily injections which can be tolerated with full maintenance of health. It has been as few as three in one case, and as many as ten in another. But in all the experiments which hitherto have been carried on as long as a fortnight, symptoms of intoxication have sooner or later appeared, have become rapidly intensified with persistence in the daily injections, and have terminated fatally. In rabbits a profuse diarrhea, attended with rapid emaciation, has been the most prominent effect. In cats this symptom has been seen, but is apparently of secondary importance, and may be absent altogether; the most prominent effect in this species is pronounced lethargy and somnolence, deepening to a terminal coma. The pathological

examination of the material has barely been begun. It is only possible to mention, therefore, with all reserve, that there is evidence of damage to the liver and kidneys, in addition to the expected signs of intestinal irritation.

Dale is aware that the dosage above indicated is somewhat, though not greatly, in excess of that which is habitually employed in human treatment. He deliberately so chose it in order to obtain evidence with a minimum delay on the important question whether a repetition of individually subtoxic doses of emetine can produce a cumulative poisoning of serious importance. The answer is already very definitely affirmed. He is fully conscious also of the care needed in applying results, obtained with experiments on different species, to human therapeutics. But with all allowance for differences in dosage and conditions, he cannot believe that these results are without significance in indicating a serious danger in pushing the administration of emetine beyond a certain point. His object is not to suggest any modification in the accepted dosage and rate of administration, but rather to reënforce, with the aid of direct evidence, the warning, which has already been sounded from other quarters, against the indiscriminate and unguarded use of emetine beyond the limits which expert observation has laid down for its employment with safety and benefit.

EFFECT OF MODERATE DOSES OF SOME OPIUM DERIVATIVES ON THE GASTROINTESTINAL TRACT OF MAN.

The *Journal of the American Medical Association* of December 25, 1915, contains an article in which PANCOAST and HOPKINS claim that the Roentgen examination is a valuable method of studying certain phases of drug effects on the gastrointestinal tract, especially motility, and the knowledge it furnishes can be gained better by this method than by any other.

Their observations were made in a series of eleven cases given morphine and in one heroin habitué. While they have been able to duplicate the phenomena observed by others, with one exception, there was a decided lack of uniformity in the effects produced in different individuals, in connection with both stomach and bowel.

There is no distinct uniformity in connection with dosage. Small doses in some may produce more marked effects than much larger doses in others. Females appear to be more susceptible.

In the stomach a rather high spasmodic hour-glass contraction is observed rarely, but they have not seen this near the pylorus as described by others. In some instances the stomach may show no appreciable change from normal. In most cases there is more or less pyloric spasm, increased peristalsis, and a decided prolongation of the emptying time.

In the small intestine, morphine causes decreased motility almost uniformly, apparently as a result of a lack of propulsion and not of spasm. When marked, it is most noticeable in the upper small bowel.

The effect on the large bowel is very variable and probably of little consequence.

Oral administration produces practically the same effect as subcutaneous injections.

VINCENT'S ANGINA.

In the *Journal of Laryngology, Rhinology and Otology* for December, 1915, WINGRAVE states that experiments *in vitro* and *in vivo* conclusively show that trikresol and formalin are the most reliable antiseptics when dealing with spirochætæ, and may be used with full confidence. Iodine, silver nitrate, chromic acid, ferric chloride, and phenol, notwithstanding their popularity, are unhesitatingly condemned. Hydrogen peroxide, perborates, and permanganates, although useful as adjuvants, are not thorough in their action.

Trikresol, 5 per cent, in alcohol may be freely and frequently applied to the ulcer without any fear of toxic results, and diluted with water to 0.5 per cent may be used as a mouth douche. Formalin is best used as lysoform, either pure or diluted, in

the same way. A very pleasant addition to either is English oil of lavender, 0.5 per cent, to the alcoholic solution.

As an astringent zinc permanganate, one grain to one ounce of water, is preferable to all other permanganates.

THE COMBINATION OF LOCAL AND GENERAL ANESTHETICS AND THE USE OF ADRENALIN.

In the *Canadian Practitioner and Review* for January, 1916, WISHART says he wishes to register his protest against the increasing tendency to perform operations upon the nose and throat under general anesthesia. In adults it is seldom necessary to resect the nasal septum, or remove the tonsils, to say nothing of operations upon the turbinals or the ethmoid, except with local anesthesia. Any operator who wilfully yields to the desires of the patient, or thoughtlessly gets into a routine of using general anesthetics, except in rare and selected cases, exposes his patient to a needless risk, and, moreover, contributes to a weakening of the public conscience. The pain involved in the operations referred to is not greater than the pain endured in filling teeth, and Wishart has performed the radical mastoid more than once under local anesthesia.

Perfect ischemia and anesthesia may be obtained by carefully packing the nose with equal parts of a 10-per-cent solution of cocaine, and of a 1-to-1000 solution of adrenalin, one hour before operating, and the sense of shock may be abolished, as Crile has shown, by the use of morphia combined with atropine, and, in selected cases, with hyoscine.

If the operator prefers the injection method, he should use novocaine, ¼ per cent, with the addition of not more than 6 minims of 1:1000 solution of adrenalin to each drachm. The injection should be made about fifteen to thirty minutes before operation.

Whenever possible, a solution of novocaine should be selected instead of cocaine, as it has toxicity of one-tenth that of cocaine.

Deaths have occurred in Toronto, where local and general anesthesia were combined, but in the absence of post-mortem examination by trained pathologists, Wishart refused to allow the fact of this combination having been used to bear responsibility, nor has he seen a death when a highly-trained anesthetist was employed.

He believes that it is in the use of adrenalin that our peril lies. Adrenalin causes a diastolic fall after two minutes, which lasts for about one hour, and this is probably due to dilatation of the aortic orifices, with temporary regurgitation (Watson).

In an article upon the cardiac effect of adrenalin, by Levy, the author points out that adrenalin belongs to a group of substances styled Sympathomimetic, of which the action is limited to structures innervated by fibers of the sympathetic system.

The heart under chloroform is in an irritable condition, and this irritability is raised under light, and lowered under deep, anesthesia. If adrenalin be injected when the patient is still under light anesthesia, the ventricles begin to contract in a chaotic sequence of irregular beats, and presently the individual muscle bundles of the ventricles, which interlace in many directions, commence to contract independently, and as a consequence the beat is no longer coordinate, and the ventricles are said to be fibrillating. In cats, the injection into a vein of a half-minim of solution of adrenalin chloride will cause this ventricular fibrillation, which is generally permanent, and ends in death of the heart in asphyxia of its tissues. When full chloroform anesthesia is used, however, such as is obtained by a 2-per-cent proportion of vapor to the inhaled air, ventricular fibrillation does not occur.

Adrenalin, therefore, should never be injected during the course of a general anesthetic, unless it be perhaps in certain cases of shock, which Wishart believes occurs in connection with abdominal operations, and where the risk has to be taken, as a *dernier ressort*. He has frequently employed a solution of cocaine or of adrenalin locally, during the course of an operation where the

bleeding became a nuisance, without inducing any unfavorable symptoms. He would think it inadvisable, however, to spray either of these solutions upon the operating area. He is not afraid of using chloroform anesthesia where he has packed the nose previously, provided it be full and continuous. The use of ether in throat and nose operations may increase the safety of the patient, but in certain manipulations, such as the removal of a foreign body from a bronchus, the use of ether complicates the process and prolongs the operation, and chloroform produces the best results.

Another point must be noted in this connection, viz., the position of the patient. Operations upon the nose and throat are greatly facilitated by the use of the upright position. For this position, however, two factors are essential: first, the anesthetic must be begun and carried on with the patient seated in the position desired for operation; secondly, the anesthesia must be light.

Finally, Wishart has no fear of using local combined with general anesthesia, even when adrenalin is required, provided he can trust his anesthetist. He prefers, for this reason, to work always with the same man, whenever possible, and would advise his confrères to adopt this rule. It requires the most highly trained anesthetist to administer anesthetics in nose and throat cases. These are the cases, in nearly every instance, in which a combination of local and general anesthesia is required.

ACTIVE IMMUNIZATION WITH DIPHTHERIA TOXIN-ANTITOXIN.

The *Journal of the American Medical Association* of December 25, 1915, contains these conclusions reached by PARK and ZINGHER:

1. Individuals who, before treatment, give a negative Schick reaction are immune probably for life, and therefore it is not necessary to inject them, when exposed, either with antitoxin or toxin-antitoxin.

2. Those who give a positive Schick reaction and are exposed to diphtheria and in immediate danger should receive either antitoxin alone or, if a longer protection is desired, both antitoxin and toxin-antitoxin.

3. For the general prophylaxis against diphtheria in schools and communities, excluding immediate contacts, a mixture of toxin-antitoxin alone (from 85 to 90 per cent of the L + dose of toxin to each unit of antitoxin) or toxin-antitoxin plus vaccine of killed diphtheria bacilli is recommended. The dose is 1 Cc. of toxin-antitoxin and 1,000,000,000 bacteria injected subcutaneously and repeated three times at intervals of six or seven days. Sufficient time has not as yet elapsed to judge the value of adding the injections of the bacilli to the toxin-antitoxin.

4. The early and the late results of active immunization should be determined with the Schick test. Early results are those obtained by the application of the test within four weeks, and late results from four months to two years after the immunizing injections.

CARBOHYDRATE INDIGESTION.

TILESTON in the *Journal of the American Medical Association* of December 25, 1915, points out that the treatment of carbohydrate indigestion is mainly dietetic. It consists in a marked reduction of the total carbohydrate intake, with exclusion of certain articles which are known to undergo fermentation readily. Such are potato, sweet potato, cabbage, beans (except string-beans), and chestnuts. The harmfulness of potato in this connection is possibly explained by the work of Lang, who found, in the course of experiments with pancreatic diastase, that potato, though easily changed to achroödextrin, is very slow to undergo the further change into sugar. In obstinate cases, particularly in the fermentative diarrhea of Schmidt, it may be necessary to resort for a while to a strict protein-fat diet, consisting of eggs, meat, fish, bouillon, butter, and tea or coffee with milk or cream. According to Schmidt, a small amount of cane-sugar and fruit jellies may be taken in

addition to the above. After a few days of such a diet, carbohydrates may be added cautiously, one at a time; sugar, cream of wheat, toast or zwieback, macaroni, and rice, in the order named. Potato is best left out of the diet for a long time. In cases without diarrhea, vegetables of low carbohydrate content, such as carrots, turnips, squash, egg-plant, and string-beans, are well tolerated from the first. They should be sieved and served with butter.

If obesity is present, a reduction in the total caloric value of the food should be combined with the limitation of carbohydrates. The relief of indigestion is often a welcome by-product of an obesity cure.

The results of the dietetic treatment of carbohydrate indigestion are most gratifying, dyspepsia of long standing disappearing in a few days. In fact, if relief is not obtained, it is probable that the diagnosis is wrong and some other condition is present.

The drug treatment of fermentation will accomplish little by itself. When combined with regulation of the diet it sometimes seems to be of benefit, but as a rule it is superfluous. The drugs most likely to give relief are the various salicylate preparations and betanaphthol. Belching can be facilitated by the administration of the ethereal oils, such as peppermint, or menthol in half-grain doses. Diastatic preparations are occasionally of service.

THE THERAPEUTIC VALUE OF QUININE AND ITS CONGENERS.

The *British Medical Journal* of December 4, 1915, states that a most interesting and valuable clinical investigation of the relative therapeutic worths of five of the chief cinchona alkaloids, and of two laboratory derivatives of the group, has recently been published by Major A. C. MacGilchrist. The alkaloids tested were quinine, which is levorotatory, and its optical isomer quinidine or conquinine, which is dextrorotatory; cinchonine and its optical isomer cinchonidine, both from the chemical point of view representing quinine without its methoxy group; quinoidine, or amorphous quinine, a tarry, treacly substance obtained from the mother-liquor of cinchona bark after the extraction of quinine and the other crystallizable alkaloids; hydroquinine, which is from the chemical point of view a reduced or hydrogenated quinine, and may be obtained either from cinchona bark or the laboratory; and ethylhydrocupreine or optoquin, a derivative of quinine introduced by Morgenroth and Levy four years ago, which has attracted a deal of attention on the Continent, and has recently been described in the *British Medical Journal.*

In his previous work with these seven alkaloids Major MacGilchrist had shown that optoquin is the least toxic for guinea-pigs, quinoidine the most toxic, while quinine salts came about half-way between the two. On the other hand, as regards infusoria, optoquin was the most lethal, quinidine the least, while quinine and quinoidine came low down on the list. In his trials of these alkaloids upon man the author treated the malarial inmates of two large jails at Alipore. As a preliminary each patient received 4 grains of calomel. The different alkaloids were given in solution and by the mouth, and a dose was administered every eight hours while the treatment lasted, so as to keep the amount of absorbed alkaloid as constant as possible. The dosage was always made proportionate to the weight of the patient. Every eight hours a blood film was prepared in the usual way, using Leishman's or Giemsa's stain, so that the time of the disappearance of the malarial parasites from the peripheral blood could be approximately estimated; a fall of febrile temperature cannot be trusted as a guide to this disappearance. A measure of the activity of each alkaloid was furnished by the period elapsing between the exhibition of the first dose and the disappearance of the asexual parasites from the peripheral blood. In all, 149 malarial patients were kept under observation for the purposes of these investigations.

In his first series Major MacGilchrist treated 72 patients with benign tertian, malignant tertian, or quartan malaria with one or other of four of the cinchona alka-

loids—namely, quinine, quinidine, cinchonine, and cinchonidine. The other three alkaloids were excluded because the larger doses required might have been dangerous. The dosage was at the rate of one gramme to seventy kilogrammes of body weight, given every eight hours. These massive doses invariably caused the parasites to disappear from the peripheral blood after nine doses; in some instances one dose sufficed, in others all nine were requisite. To give an example of the results registered: in the case of benign tertian fever the average numbers of doses necessary were 4.7 for quinine, 5.0 for quinidine, 5.5 for cinchonine, and 5.6 for cinchonidine. This amplitude of variation is naturally too small for a comparative test of the value of these alkaloids, and in addition it must be remembered that the results obtained appear to depend more upon the stage reached by the developmental cycle of the parasite at the moment when treatment is begun than upon any other condition.

In a second series of experiments the attempt was made to determine the minimal effective dose of quinine in the three varieties of malarial fever treated. The number of patients was fourteen; the number of doses was not limited to nine, and the treatment was continued while the patient remained in the jail hospital. As in the previous series, the dosage was proportional to the weight of the patient's body. The second series cannot be regarded as complete or final in any way, but it enabled Major MacGilchrist to conclude, as a working result, that the minimum therapeutic dose of quinine at eight-hour intervals for a patient weighing seventy kilogrammes is 0.1 gramme for benign tertian, 0.15 gramme for malignant tertian, and 0.2 gramme for quartan infections. These doses caused the parasites to disappear from the blood in a few days.

Armed with this knowledge, Major MacGilchrist proceeded to his third series of patients, sixty-one in number. The seven alkaloids were administered to them in the minimal doses given above for quinine, according to the variety of malarial infection present; the medicine was continued as long as the patients remained in hospital. In this series, as in the last, the number of patients with each variety of malaria treated with each of the seven alkaloids is not large enough to justify any final and decisive conclusions. Yet many interesting facts emerge from their consideration. The large doses of the first series acted, as was to be expected, more quickly than the smaller doses of the third series, so that the number of doses given in the latter was larger (but not very much larger) than in the former. On the other hand, the total amount of alkaloid required to free the peripheral blood of asexual parasites in the small dose series was only a quarter to a sixth part of that requisite in the large dose series. Major MacGilchrist's paper contains a great deal of information interesting to parasitologists which must here be passed over; but he gives an interesting comparison of the relative therapeutic antimalarial values of the alkaloids he tested in a tabular statement of the average total amount of each drug, expressed in grammes per 70 kilogramme body weight, required to free the peripheral blood of asexual parasites in benign and malignant tertian infections combined: Hydroquinine hydrochloride 0.765 gramme, cinchonine sulphate 0.915 gramme, quinine sulphate 0.95 gramme, quinidine sulphate 1.12 grammes, optoquin hydrochloride 1.22 grammes, quinoidine 1.79 grammes. These figures are calculated for the free alkaloids, not for their salts.

It is interesting to note that clinical experience with malaria thus agrees with the results of experiment *in vitro* with infusoria, so far as the natural cinchona alkaloids are concerned, but not in the case of optoquin. As for the occurrence of by-effects, summed up in the term "cinchonism," these were practically absent in the small dose series. In the large dose series, quinine, cinchonine, and quinidine were the chief offenders. Apart from their obvious practical applications, it is clear that Major MacGilchrist's valuable results are bound to modify considerably the opinions expressed in the current manuals of thera-

peutics and pharmacology on the various cinchona alkaloids and their relative values in the treatment of malaria. Not a few of his conclusions support opinions previously expressed by Continental workers in this field.

MR. BARKER'S METHOD OF SPINAL ANESTHESIA.

HAIR in the *Canadian Practitioner and Review* for January, 1916, asserts that to Mr. Barker, University College Hospital, London, England, must be given the credit for the present perfection of spinal anesthesia as practiced in many of the surgical clinics in Europe, especially in Britain. Of late many of the earlier difficulties owing to a better technique have been overcome, such as:

1. The prevention of deterioration of the anesthetic by using ampoules made of Jena glass.

2. The breaking of the needle in the spinal canal.

3. Localization of the solution after injection.

The anesthetic now used consists of a solution composed of the following:

Stovaine, 5 gms.
Glucose, 5 gms.
Aqua dest., 100 gms.

Each ampoule contains about 2 Cc., of which only 1 Cc. is injected; the remainder allows for waste or loss.

This solution has a specific gravity of about 1.023, which allows it to gravitate to the most dependent part of the spinal canal.

The needle now used is an ordinary puncture needle made of nickel with stylet that will bend if pressed on, if the patient suddenly kinks the spinal column from pain or otherwise. The use of the nickel needle has done away with the danger of draining away the spinal fluid into the tissues if the needle is broken, and this method is particularly applicable to all methods of spinal puncture.

The patient is usually placed on the side in a horizontal position, on a table with a pillow with an elevated head-rest. The shoulder resting on the table is used to raise or lower the upper part of the spinal canal by drawing the arm forward. The assistant, standing face to the patient's abdomen, forcibly flexes the knees to the face by passing one arm over the back of the neck and the other over the knees and approximating these parts, thus separating the spinous processes. The operator, who is seated facing the back of the patient (his eyes being about on a level with the spinous processes), places his index and middle fingers in the interspace between the second and third lumbar spines, the fourth being taken as in line with the crest of the ilium, and with his right hand passes the needle directly through the skin, then upward and inward until the spinal canal is approached, when the stylet is withdrawn, the entrance to the canal being indicated by the escape of spinal fluid. A few drops are allowed to drain away, and then 1 Cc. of the solution is injected through the puncture needle. The position of the patient is then altered according to the side of the operation. If on one side, he remains there until feeling is lost in that leg, then turns on the back. By elevating the thorax, the solution will gravitate to the lower part of the canal, thus anesthetizing the extremities. The duration of the anesthetic is about forty-five to fifty minutes, and if successfully accomplished is ideal in its action.

The after-effects of the anesthetic are:

1. Headache. This is very variable and usually depends considerably on the temperament of the patient.

2. Vomiting occurs occasionally during the anesthetic stage and disappears as the effects go off.

3. Rarely diplopia. This after-effect seems to be hard to explain.

Spinal anesthesia undoubtedly has a place where patients are not suitable for general anesthetics, being particularly good in old patients in whom shock is of great prognostic value, and in whom kidney function is decidedly lessened. It is not necessary to mention a list of operations, but one in which it can be used with great success is in a prostatectomy, where usually both age and lessened kidney function are factors,

or where marked relaxation of sphincter muscles is desired; besides, nearly all short operations in the lower abdomen or upon the extremities can be performed with decidedly little anesthetic effect.

TETANY IN AN ADULT FOLLOWING POISONING FROM ERGOT.

In the *New York Medical Journal* of December 18, 1915, EMSHEIMER reports a case of this nature. The most common cause of tetany in adults, in this country, is some form of gastric or intestinal disorder, especially dilatation of the stomach. Tetany occurs less frequently in the course of one of the acute infectious diseases, such as typhoid fever or influenza; during pregnancy; after parathyroidectomy; following poisoning from chloroform and various metals; and as a complication of certain organic nervous diseases, such as syringomyelia and cerebellar neoplasm. Its occurrence, however, after excessive doses of ergot is so rare that the following case seems worthy of note:

Saleswoman, aged twenty-five years, single. Past history negative. There had been no previous similar complaint, no symptoms suggesting organic nervous disorder, and no hysterical manifestations. For two days prior to the onset of the present acute illness there had been some diarrhea.

While at work the patient was suddenly seized with severe epigastric cramps, followed immediately by nausea and vomiting. She managed to get to her home. Emsheimer saw her about an hour later. At that time she seemed dazed, semidelirious, and extremely restless. Pressure upon the supraorbital nerve failed to awaken her from her semiconscious state. Attempts to question her brought incoherent replies. Most striking, on further inspection of the patient, was the position of her extremities. There was a more or less general rigidity of both arms and legs and a typical bilateral carpotarsal spasm. The elbows and wrists were acutely flexed, and the hands drawn toward the ulnar side; the thumbs were adducted beneath the fingers; there was flexion of the metacarpophalangeal joints, extension of the phalangeal articulations. The feet were extended at the ankles, the toes flexed at the metacarpophalangeal joints. The Chvostek sign was easily obtainable. The Trousseau sign could not be elicited. There were no facilities for testing the electrical reactions. The reflexes were difficult to interpret on account of the rigidity of the muscles of the extremities. There were no other abnormal physical signs.

Within ten minutes of the administration of fifteen grains of chloral hydrate and thirty grains of the triple bromides, per rectum, full consciousness returned, and the spasm of the hands and feet began slowly to relax. It was fully one-half hour, however, before all the evidences of carpotarsal spasm had disappeared. A second examination of the patient at this time revealed normal mentality, normal reflexes, and normal sensations. There were no tremors, local contractures, nor areas of anesthesia.

On questioning the patient as to the cause of her illness, Emsheimer elicited the fact that, one week before the onset of the present attack, the patient, having passed her menstrual period three days, took a large dose of fluid extract of ergot (quantity unknown, as she had taken a swallow of the liquid directly from the bottle), and continued its use in teaspoonful doses every two hours for five days. She had had some nausea and diarrhea, but no other symptoms of ergotism, up to the onset of the present condition. There was still amenorrhea.

Despite the fact that the symptoms of tetany became manifest only after a period of two days from the date at which the ergot was discontinued, there seemed to be no other etiological factor which could satisfactorily explain the peculiar phenomenon. Autointoxication or acute gastric dilatation as a cause of the spasm was practically eliminated by the fact that the patient had not eaten an excessive amount of food in the few days prior to the onset of the attack; had not partaken of fish, canned meat, or any other food capable of producing ptomaine poisoning. Moreover,

no physical signs presented of dilatation of the stomach. The tetany of pregnancy was ruled out by the fact that tetany occurs in this condition only during the later months. The diagnosis of hysterical pseudotetany, with the fear of possible pregnancy as a most important contributing factor, was not so easily precluded. But the lack of previous hysterical manifestations and the absence of physical signs of true hysteria rendered that diagnosis less likely than that of acute toxic tetany, from the delayed or cumulative action of ergot.

Unfortunately, Emsheimer was not able to make further observations in this case as he did not see the patient a second time. He was informed, however, about one month later, that she had had a recurrence of her acute attack.

CLINICAL OBSERVATIONS ON LUETIC DISEASE OF THE HEART AND AORTA.

MUSSEY in the *Journal-Lancet* of December 15, 1915, after discussing this subject at some length concludes as follows:

1. In 1379 cases of syphilis, clear-cut syphilitic disease of the heart or aorta occurred in 59 (4.29 per cent).

2. The aorta seems to be affected by syphilis more frequently than the heart.

3. Syphilis of the heart does not present a typical syndrome other than that of myocardial change. The positive Wassermann is almost necessary for a definite diagnosis.

4. Syphilis of the heart, while presenting graver immediate symptoms, responds more readily to treatment, and the benefit is more lasting than in syphilis of the aorta.

5. Syphilis of the mediastinum presents a clinical history similar to that of cardiac syphilis, and also shows a similar benefit from treatment.

6. The use of potassium iodide with mercury is of value, even when the patient is showing marked evidence of decompensation.

7. The use of the iodides and mercury in some cases seems of value preceding the use of salvarsan.

8. Salvarsan, and especially neosalvarsan, is of considerable value in syphilis of the heart and aorta, and can be used in small doses even in severe cases.

9. The use of vigorous and persistent antispecific treatment will relieve the discomfort, and apparently arrest the progress of certain aneurismal cases.

THE TREATMENT OF THE DISTURBANCES OF DIGESTION IN INFANCY.

In the *New York State Journal of Medicine* for February, 1916, MORSE tells us that so little is known accurately as to the normal intestinal flora and as to the normal variations in the relation of the individual elements of this flora to each other as the result of changes in the relative proportions of the various food elements, that it is extremely difficult to draw any positive conclusions from the microscopic examination of the stools, not only as to what organism or organisms are causing the trouble in a given case, but also as to what organisms may in general cause excessive fermentative changes. There is a certain amount of fairly satisfactory evidence to show that butyric acid bacilli, the B. acidophilus and the B. putrificus, may cause abnormal fermentative changes in the intestinal contents. It is probable that under certain conditions the colon bacillus may also be the cause of abnormal fermentative processes. The unrestrained and excessive activity of the normal lactic-acid-forming organisms of the intestinal flora may also result in an excessive acid fermentation sufficient to cause definite and severe symptoms.

It is often difficult to distinguish between simple indigestion and indigestion with fermentation. Indigestion with fermentation is in general, however, a more serious condition than simple indigestion. It is more often acute than chronic. It is likely to be associated with fever, which is often high. Vomiting is relatively uncommon. Diarrhea is a marked symptom in almost all cases. The character of the stools depends upon which of the food elements is being

attacked by the microörganisms which are the cause of the trouble in the individual case. In the vast majority of instances indigestion with fermentation is due to organisms which produce fermentative changes in carbohydrates and to a less extent in fats. The stools are, therefore, usually green in color, strongly acid in reaction and odor, and irritating to the skin. They often contain a considerable amount of mucus, as the result of the irritation of the intestinal mucosa by the highly acid intestinal contents. They are often frothy, and not infrequently contain many small, soft, fat curds. When the disease is caused by the abnormal activity of proteolytic organisms, the stools are more often yellow or yellowish-brown than green. They are ordinarily alkaline in reaction and have a foul odor. They seldom contain curds, and mucus is a less prominent constituent. In one type of this class of cases the stools are rather characteristic, being frequent, small, watery, dark-brown, alkaline, and with a peculiar musty odor.

It is advisable in all acute cases of indigestion with fermentation to at once thoroughly clean out the intestinal tract. All food should be stopped for from twelve to twenty-four hours and water given freely. It is not safe, however, to continue the period of starvation longer than twenty-four hours when the microörganisms which are causing the trouble are of the proteolytic type, because the intestinal secretions are protein in nature and therefore provide a suitable culture medium for proteolytic bacteria. There is no objection to a longer period of starvation when the microörganisms are of the types which thrive on fats and carbohydrates.

The object to be aimed at in the treatment of indigestion with fermentation is the destruction, or at least the inhibition, of the activity of the microörganisms which are the cause of the disease. It is useless to attempt to do this by the administration of drugs by the mouth, because it is impossible to give any of the so-called intestinal antiseptics in large enough doses to have any effect on the pathogenic bacteria in the intestine without poisoning the baby. If they did have any action it would be exerted, moreover, on the antagonistic as well as the pathogenic bacteria. They would be likely, therefore, to do as much harm as good. It is possible that the salts of bismuth may diminish the intensity of the symptoms to a small extent. They do not have, however, any curative action. If used, they should be given in large doses. The subcarbonate or the milk of bismuth are safer than the subnitrate. Irrigation of the bowels is useless, because the fluid does not reach the small intestine, where the trouble lies.

It is possible in some instances to destroy the pathogenic microörganisms, or at any rate to materially diminish their numbers and inhibit their activity, by the administration of antagonistic bacteria. This method has been proved to be effectual when the disturbance is due to the B. perfringens and organisms of the gas bacillus group. Lactic acid bacilli have an antagonistic action on all of these organisms. They are indicated, therefore, in the treatment of indigestion with fermentation due to organisms which thrive on carbohydrates. They may be given in the form of broth cultures, in the form of buttermilk, or in the form of modified milk ripened by them. The best method of giving them, however, is in the form of ripened modified milk, because when given in this way the food can also be modified to suit the needs of the individual infant. Lactic acid organisms are also indicated in those conditions in which the disturbance is due to the proteolytic organisms which they antagonize. They should not be given, of course, in those cases in which the disease is due to the excessive activity of lactic acid organisms.

Another way by which the number of the organisms causing indigestion with fermentation can be diminished and their activity inhibited is by a change in the character of the infant's food. A change in the character of the food results in a change in the character of the intestinal contents—that is, in the medium in which the patho-

genic organisms are growing. If these are of the types which thrive on carbohydrate media, the percentages of the carbohydrates should be diminished and that of the protein increased. The percentage of the fats should also be diminished. When the organisms are proteolytic, the percentage of the protein should be diminished and that of the carbohydrates increased. When the disturbance is due to fermentation of the carbohydrates, much can be accomplished by changing the character of the carbohydrate. Protein food, such as beef juice, broth, and albumen water, should not be given in the cases in which the disturbance is due to proteolytic organisms. It is not usually necessary to examine the stools bacteriologically, because it can almost always be told from the character of the stools whether the organisms at fault are those which thrive on carbohydrates or those which thrive on protein.

Babies that are seriously ill with indigestion with fermentation are very likely to show one or more rather characteristic symptoms or groups of symptoms. One of these groups of symptoms almost invariably develops toward the end in fatal cases. These symptoms are:

(*a*) Excessive vomiting.

(*b*) Hyperpyrexia.

(*c*) Symptoms of irritation of the central nervous system.

(*d*) Prostration and collapse.

It is probable that these symptoms are chiefly manifestations of toxemia. It is presumable that the loss of water through the bowels may also play a part in their production.

If, when any of these symptoms appear, there is any doubt as to whether the bowels have been thoroughly emptied, it is advisable to repeat the initial catharsis. It is also advisable, if the condition of the nutrition warrants it, to withhold food for about twelve hours. Caution must be exercised, however, about withdrawing the food if the disturbance is due to proteolytic organisms. If there is excessive vomiting, food should be withdrawn entirely and the stomach washed out with a solution of bicarbonate of soda. The hyperpyrexia is best treated by the use of cold externally. It is seldom advisable to give the coal-tar products to infants to reduce the temperature. Bromide of soda, in doses of from five to ten grains, by the mouth, may be given for restlessness and excitement. It may be combined wtih one or two grains of chloral hydrate. It is useless to give drugs by enema in this condition as they are almost never retained. Small doses of morphine subcutaneously may be necessary. If the fontanel is full, a lumbar puncture will often give relief. Prostration and collapse are to be treated as when they occur in other conditions. It must be remembered, however, that all forms of treatment weaken and exhaust the baby. The baby should be disturbed as little as possible. Alcohol is contraindicated when these conditions are associated with vasomotor paralysis and lowering of the blood-pressure. Adrenalin is of some value, but must be given subcutaneously or intravenously. Strychnine is in general the most useful of the stimulants, while caffeine and camphor are the best quick stimulants.

THE TREATMENT OF CHOLERA BY THE ADDITION OF ATROPINE TO THE HYPERTONIC AND PERMANGANATE TREATMENT.

In the *Indian Medical Gazette* for January, 1916, ROGERS says that atropine hypodermically has further greatly reduced the death-rate in cholera. It appears to act by lessening shock, raising the blood-pressure, diminishing the frequency of the respiration, increasing the flow of urine, and diminishing slightly the number of intravenous injections required. The number of deaths from collapse and from pneumonia has been greatly diminished, while the total mortality in the atropine series has fallen off one-half that of the controls, and to but little more than one-sixth of the death-rate before he introduced the present system of treatment; a reduction in the mortality of a very serious specific disease by means of simple measures,

based on prolonged scientific research, controlled by minute clinical observations, which, even in these days of rapid advance, has probably only been equaled by the antiseptic treatment of wounds, antidiphtheric serum, and emetine in amebic disease.

In view of the importance of the addition of atropine and alkalies to the hypertonic saline and permanganate treatment of cholera, it may be well to take this opportunity of briefly summarizing the principal points in the present system of treatment of Rogers.

On admission give one-hundredth of a grain of atropine hypodermically and repeat it morning and evening. Take the specific gravity of the blood, the blood-pressure, and the temperature in the mouth and rectum. If the blood-pressure is not over 70 mm., or the specific gravity is 1063 or over, give an intravenous injection of sterile hypertonic saline of three, four, five, or even six pints, in accordance with whether the specific gravity is 1063, 64, 65, or 66 and over in male adults, and correspondingly less in females and children in proportion to their approximate weights. Unless the rectal temperature is below 99° F. the saline should never be injected at above blood heat (98° F.) for fear of producing hyperpyrexia. If the rectal temperature is 100° F. or over, the fluid should be given at a temperature between 80° and 90° F. The hypertonic solution should contain 120 grains (8 grammes) of sodium chloride and 4 grains (0.4 gramme) of calcium chloride. Rogers for long added 6 grains of potassium chloride, but some physiologists consider it unnecessary and possibly harmful, so he now omits it. Permanganate of potash to be given in two-grain pills, made up with kaolin and vaselin, and preferably coated with salol or keratin, two pills every quarter of an hour for two to four hours, in accordance with the severity of the case, and then two every half-hour until the stools change to green or yellow and become comparatively small. Barley water and plain water by the mouth in small quantities at a time (three or four ounces) to be given frequently, but no other food during the attack. Normal saline (sodium chloride, grains 90 to a pint) half a pint every two hours by the rectum until the collapse stage is passed and urine is being excreted regularly, and then reduced in frequency to every four hours and continued until two pints of urine are passed in twenty-four hours.

The fall of the blood-pressure to 70 and under, or the rise of the specific gravity to 1063 or above, are indications for a repetition of the intravenous injection, estimations being made regularly morning and evening, and at any time that the pulse tends to fail or the patient becomes restless. At each repetition of the injection, and at the first injection in all cases admitted late with suppression of urine for twenty-four hours or more, give one pint of the following alkaline solution: Sodium chloride grains 60, and sodium bicarbonate grains 160 (2 per cent), and continue with the ordinary hypertonic solution up to the total amount indicated by the specific gravity of the blood. The alkaline solution counteracts the tendency to acidosis, which is the most essential cause of post-choleraic uremia.

If the urinary excretion is deficient in the later stages with a blood-pressure of 100 mm. or more and a specific gravity of below 1063 but not much below the normal point of from 1056 (in Indians) to 1058 (in Europeans), give one pint of the above solution subcutaneously, or better intravenously, to increase the urinary flow. The alkalies in such cases should also be given by the rectum instead of normal saline.

If the blood-pressure remains persistently much below 100 mm. and urine is deficient, give pituitrin hypodermically and caffeine sodio-salicylate in five-grain doses by the mouth every four hours, and dry-cup and foment over the kidneys repeatedly.

In very young children and feeble old patients glucose may be given in the rectal saline to support the strength.

The above are the main points in the treatment of cholera on the system of

Rogers, worked out from a minute study of over 1000 cases in which detailed notes have been kept, tabulated, and analyzed. Full details regarding the technique of intravenous injections will be found in his book on the subject.

AUTOGENOUS VACCINES IN THE TREATMENT OF BRONCHITIS AND ASTHMA.

BABCOCK in the *Lancet-Clinic* of February 12, 1916, reports his results in the treatment of asthma and bronchitis by autogenous vaccines. He reaches these conclusions:

1. Autogenous vaccines from the sputa have yielded such results in three cases of acute bronchitis, one of chronic bronchitis and four of chronic bronchitis associated with attacks of spasmodic asthma, as to warrant the writer in recommending this mode of therapy as against the old-time use of expectorants.

2. In bronchitis independent of asthma, the organisms have been mainly of bacillus mucosus, the diplococcus mucosus, the micrococcus catarrhalis, and an influenza-like bacillus, while in cases of bronchial asthma an anaerobic fusiform bacillus has been added.

3. The asthma has yielded to this vaccine treatment only when this anaerobic fusiform bacillus has been largely present in the vaccine.

4. Great care should be exercised in the use of vaccines that the dosage be not so large or so often given as to cause reaction, since this reaction, whether general or local, indicates a negative phase and aggravates the patient's condition.

The main drawback to the use of autogenous vaccines is the necessity of perhaps several cultures, and the preparation of new vaccines should the cultures show that some of the originally found germs have disappeared or become subordinate in number to others.

6. New vaccines should be prepared whenever the condition of the patient seems to have come to a standstill.

THE THERAPEUTICS OF CANCER.

The *Medical Record* of April 8, 1916, points out that the renewed interest in cancer which followed the discovery that malignant growths can be transplanted from one animal to another has extended from the domain of experimental pathology to that of therapeutics, and no sooner is a report issued from the laboratory than the procedure is tried at the bedside. It is right that this should be so, provided only inoperable cases are chosen, for in our efforts to control this dreadful scourge nothing must be left undone; the immediate and blind application of a method, however, is not right. The attitude of the therapeutist toward the laboratory should be as critical as he can make it, in order that he may be in a position to select the most reliable results for his clinical investigations; an experiment, said a great investigator once, is not necessarily scientific because it has been performed on a rabbit.

But even more important than this critical attitude should be one of endeavor to discover exactly what it is that the laboratory is trying to bring about. For example, while it has been discovered that mice can be immunized with normal mouse tissues against the inoculation of tumors, it has been expressly stated by those best qualified to know that such treatment has no effect upon transplanted tumors already established. Now as these are under relatively unfavorable conditions compared with spontaneous neoplasms, being composed of the cells of an animal other than that in which they are proliferating, while the latter consists of cells of the animal itself, it is evident that transplantable growths should be much more easily cured than spontaneous; and yet even these inoculable neoplasms cannot be healed at present. Nevertheless, many attempts have been made to cure spontaneous tumors in man, in spite of this distinction, by the injection of normal human tissues, generally in the form of extracts, although the laboratory has definitely explained that living and intact cells are necessary for the production of immunity; and not only have normal

tissues been tried, but emulsions of living tumor cells have been introduced, which, in several instances, have led to the production of new tumors at the point of inoculation.

All this is not so much the fault of the clinician, perhaps, as it is his misfortune, for he is no better able to judge between conflicting laboratory reports than the experimental pathologist would be to choose between two rival therapeutic methods. On the other hand, pathologists do not differ so greatly in opinion as the contradictory nature of much of their writing would suggest; a great deal of the apparent disagreement is due to the fact that it was not realized in the first few years of cancer research that transplantable tumors vary remarkably in such characteristics as type of growth, susceptibility to immunity, etc., and that in some of them even complete spontaneous disappearance is not an unusual occurrence in untreated animals. Fränkel and Fürer (*Wiener klin. Wochenschr.*, 1915, xxviii, 1433, and 1916, xxix, 63) have, therefore, performed a work of great value to both clinician and pathologist in reviewing some of these earlier conflicting findings in the light of our more recent knowledge. They have carefully investigated the question whether cell-free juices from the tumors of rats and mice have any immunizing or therapeutic action in these animals, and have found that they possess neither.

Their second paper is devoted to a discussion of the effect of foreign sera upon growing tumors, it having been assumed by various writers that the serum of a normal individual differs from that of the cancerous organisms in the possession of some substance injurious to the cancer cell, or that it contains a ferment with the power of dissolving tumor cells. Fränkel and Fürer very wisely divorced themselves from all theory, and set themselves the task of finding out simply whether foreign serum would or would not influence the growth of transplantable neoplasms. Mice bearing carcinoma or sarcoma were inoculated intravenously one or more times with horse, goat, sheep, goose, rabbit, and guinea-pig serum, but in no case was the tumor definitely affected, although amounts of from one-fortieth to one-twentieth of the body weight were introduced. In a few of the animals the rate of proliferation was somewhat retarded; but a similar occurrence was noted in some of the untreated controls. The experiments have an important bearing upon the many attempts that have been made to influence new growths in the human subject by the injection of serum from adults or from infants, the procedure being based, in the latter instance, upon the false assumption that because infants do not have cancer there must be some protective substance in their blood.

In conclusion, it is necessary to point out only that no authoritative cure of either transplantable or spontaneous neoplasms in animals has yet been published, even the selenium cure, from which so much was looked for in some quarters, having been proved a complete failure. In man, therefore, the surgeon still may, with more or less apparent justification, claim that the only hope of relief lies in early and complete surgical removal.

NITROUS OXIDE IN OBSTETRICS.

The *Boston Medical and Surgical Journal* of March 30, 1916, contains an article by IRVING in which he reaches these conclusions:

1. Nitrous oxide and oxygen is the most successful analgesic known for the relief of the pains of labor.

2. It is the safest anesthetic there is. It has no untoward effects, immediate or remote, upon either mother or baby.

3. It does not delay labor or in any way impair the efficacy of the uterine contractions.

4. It is pleasant to take, and recovery from it is extremely rapid and usually featureless.

5. It can be administered anywhere, and it can be employed by any physician who will take his confinement cases seriously enough to retain a capable assistant for its administration.

PROMPT CURE OF GONORRHEA.

WYETH (*New York Medical Journal,* Feb. 5, 1916) states that if a patient is seen within twenty-four hours after a urethral discharge has begun, except in primary cases, a cure can be effected in five to seven days. A microscopic examination of the pus is first made. Here at the outset we can determine the prognosis with a certain degree of accuracy by the microscopical findings, for it has been the author's observation that cases with a profuse, purulent discharge, in which the leucocytes show that they are functioning by the pus corpuscles being filled with gonococci, invariably yield more kindly to this treatment than do cases with scant discharge in which gonococci are mostly extracellular. The patient is instructed to urinate into two glasses, passing most of the urine into the first glass and the last two or three teaspoonfuls into the second glass. If this second urine is clear, and the patient gives no clinical evidence of a posterior involvement or other complications, we may hope to succeed with the so-called abortive treatment. By means of a Janet-Frank syringe with a Wheeler tip, the anterior urethra is flushed with 300 to 450 Cc. of a 0.25- to 0.5-per-cent solution of protargol, depending upon the intensity of the inflammation. The head of the penis is held firmly between the thumb and first finger of the left hand, the tip of the syringe is inserted into the meatus, and the solution slowly injected until the anterior urethra is filled. The syringe is then slightly withdrawn, and the solution is allowed to flow out. Successive flushings are continued until the whole amount of solution is used, always with care that no undue pressure is exerted, as from the use of an elevated irrigator.

A hand syringe of at least two drachms' capacity is prescribed, and the patient is instructed how to inject the urethra himself every four hours, being told first to urinate and then slowly and gently inject the solution, which is to be retained in the urethra for three minutes. This procedure is to be repeated, thus making two three-minute injections every four hours. Very often after such treatment, at the patient's visit the following day, the author has found that the microscope showed no gonococci. In such cases a fairly encouraging prognosis may be made. Even if a few gonococci are still to be seen, there is no reason for discouragement as to the possibility of cure within five or six days. The initial treatment is repeated, and the patient reports on the following day, though more favorable results may be expected if the patient can be seen twice daily. No internal medicine is given, and no diet regulation is attempted, beyond the advice that the patient abstain from alcohol and highly seasoned foods. Exercise should be interdicted to prevent complications, and the patient is directed to drink freely of water.

After the third day, if no gonococci are found, the frequency of the patient's injections is decreased; and after the fourth day all treatment is discontinued, although the patient is kept under observation. Should he remain free of gonococci the case is said to be aborted. If, on the other hand, not all the gonococci have been eliminated, immediate treatment is again instituted and regulated by the microscope. Though our hope may not have been realized, yet we have at least the satisfaction of knowing that we have not unduly prolonged the attack, and that by continuing the treatment we can limit the duration of the gonococcal infection to from three to six weeks instead of the usual six weeks to three months.

THE PREVENTION OF PERITONEAL ADHESIONS BY THE USE OF CITRATE SOLUTIONS.

WALKER and FERGUSON (*Annals of Surgery,* February, 1916) contribute a convincing paper with the following conclusion:

Hypertonic citrate solutions do, under certain conditions, prevent peritoneal adhesions after laparotomy. The best solution is sodium citrate 3 per cent and sodium chloride 1 per cent.

In human surgery, the citrate solution should, theoretically, be used as it has been experimentally—*i.e.,* after clean laparoto-

mies, a sufficient amount of solution should be introduced into the abdomen to bathe the whole peritoneum. Smaller amounts would be of little value, for any fluid introduced into the abdomen soon becomes distributed over the whole cavity. Practically, the question of whether or not the citrate solution will cause surgical shock in humans must be determined by actual tests in the operating room. If, as we anticipate, no shock is caused, the solution should be used as advised above.

When it is necessary to pack off intestines with gauze, if the pack is wet with citrate solution much fewer adhesions should result.

Absolute asepsis is essential. Adhesions cannot be prevented in the presence of infection.

Gentleness in handling peritoneum is important, for the more injured peritoneum left after operation, the greater is the likelihood of adhesion formation.

Large areas denuded of peritoneum should be covered by plastic operations or omental grafts, for the larger the denuded areas left, the more difficult is the prevention of adhesions.

Iodine should be used in abdominal surgery with great care, or better, not used at all, for a very little of it allowed to touch the bowel causes masses of adhesions.

Dry gauze should not be allowed inside the abdomen.

Pope (same journal) corroborates these findings, stating that he has experimentally demonstrated that the citrate solutions are definitely superior to all hitherto suggested measures.

THE INDUCTION OF LABOR IN NORMAL PELVES AT TERM.

Reed (*Surgery, Gynecology and Obstetrics,* March, 1916) assumes that a mature child is 50 cm. long and weighs between 5 and 8 pounds. The estimate of the child's size as obtained by Ahlfeld's rule rarely varies more than 2 cm. from the actual postpartum findings, and usually is as close as 1 cm. or less. Ahlfeld's rule is simple. In vertex cases measurements are made with the pelvimeter from the upper border of the symphysis to the breech of the child; the result is doubled and 2 cm. subtracted for the thickness of the abdominal walls. The result is the length of the child. Seventeen weeks from conception is accepted as the approximate date of quickening. Thereafter 22 weeks are counted from this day as the culmination of the pregnancy.

The next step is to have the labor come on at the time set. The work may be done in any aseptic environment, but the hospital is preferable. The patient receives attention to the bowels the night before, and in the morning is given careful obstetric preparation of external genitalia. Then under strictest asepsis a Voorhees bag is introduced without rupture of membranes. Brodhead's report of 139 cases in 1912 is pioneer work in this field and has not received the attention it deserves.

The technique is as follows: Assemble and sterilize by boiling 20 minutes a Voorhees bag No. 4, a Simon speculum or vaginal retractor, a pair of long Pean forceps, 2 pairs vulsellum forceps, 1 dressing forceps, 2 pairs compression forceps, a Goodell dilator, 1 tenaculum forceps, a hand bulb syringe with glass tubes and rubber connections for the bag.

The patient, prepared as for delivery, is placed upon the table in exaggerated lithotomy position. Stirrups will serve. The vagina is retracted, a smear made from the cervix, and the mucous membrane wiped clean with pledgets of gauze on forceps. Anesthesia is only occasionally necessary even in primiparæ. Before using, the apparatus must be tested by forcibly filling the bag with sterile solution. One lip of the cervix is seized by the vulsellum forceps and brought down. Usually, even in primiparæ, the os is sufficiently patulous to admit the bag; if not, dilate.

The bag is emptied of residual air and fluid and the flat end pulled out. It is now rolled up into a compact mass like a cigarette and seized with Pean forceps, so that the tips extend just to the largest diameter

of the rolled bag. Anoint with sterile glycerin, turn the curve of the forceps toward the patient's left leg, and introduce. As the bag enters, turn the mass to the operator's left—a quarter turn—so that when the operation is completed the forceps curve looks upward. Release lock on forceps. Connect tube with syringe and force sterile solution slowly into the bag. Pean forceps may be removed as bag fills. Remove vulsellum. Tie tube with tape when bag is full, disconnect syringe. Put sterile pads on each side of tube.

If pains do not start within an hour, or if compression is desired as in placenta previa, or a more rapid dilatation, then a weight of one or two pounds is attached by a tape to the protruding tube and passed over the foot of the bed. Uusually in from five minutes to half an hour contractions begin, and labor has been inaugurated just as one would start the pendulum of a clock.

In a variable period, rarely more than four hours—three hours and twenty minutes was the average in the author's series—the bag is expelled by strong pains, the dilatation is practically complete, the head follows the bag down, the membranes rupture, and the second stage begins. From now on the case is managed according to general obstetrical principles. If the pains are weak and shallow, pituitrin may be administered; if strong and regular, morphine and scopolamine or gas or chloroform may be added. The tedious, exhausting, and painful first stage has been materially shortened and definitely controlled. The bag acts as a dynamic stimulant to the contractions, as well as a mechanical aid to cervical dilatation, and it preserves the membranes from injurious pressure until physiological rupture occurs.

In a series of 100 consecutive cases, the bag broke shortly after the insertion six times. There were two maternal deaths, one from placenta previa and one from pneumonia. Seven babies died. There were three cases of version and extraction for placenta previa, transverse presentation, and prolapsed cord. There were four cases of breech presentations, two of placenta previa, one of prolapsed arm, one of mitral stenosis, one of mitral insufficiency. There were 17 cases of lacerations of the perineum, of two degrees or less, and episiotomy. Forceps were used in 23 cases, seven cases had postpartum temperature.

The highest advantage of the procedure lies in the fact that the course of labor is entirely under the control of the obstetrician from start to finish. There is no timidity, indolence, or dubiety. The day is appointed; the cervix dilated slowly or quickly, the contractions are strengthened or weakened; the pelvis is enlarged or let alone; complications are boldly met or foreseen and avoided; the labor is hastened or prolonged; the pain is permitted, diminished, or abolished according to the judgment of the operator. The process works in strict harmony with the principles of modern science.

THE PRODUCTION AND SELF-DESTRUCTION OF DOMESTIC FLIES IN HORSE MANURE.

ROUBAUD (*Journal of the Royal Army Medical Corps,* January, 1916) presents an article of great importance upon this question. He notes that manure kept only for twenty-four hours in a stable produces in the warm months an average of 10,000 to 20,000 flies per cubic meter; the proportion may even reach 30,000 to 35,000. It is estimated that a horse produces sufficient manure to give rise to the development during the summer of 40,000 to 50,000 flies per month, even 160,000 to 200,000 flies during the most favorable season, viz., June and September.

Fresh manure alone plays a part in the production of flies. The laying of eggs even takes place in the stable on the dung impregnated with urine, an indispensable condition. Oviposition may continue for twenty-four hours, but never later. Fermentation, after barely twenty-four hours, definitely protects the manure from the laying of eggs. Antiseptic substances and larvicides (borax, cresol, ferrous and ferric salts), by delaying fermentation, may prolong deposition one or two days. Em-

ployed as larvicides these substances, by prolonging the period of infestation, often produce a result the very opposite of that intended. From the sixth day manure when placed in a heap does not contain larvæ, these having migrated to the base for nymphosis. Antifly measures, therefore, ought to be taken within five days of the removal of the manure from the stable. Manure twenty-four hours old at the time of the removal does not contain visible larvæ. The eggs which are disseminated throughout the manure heap then open and the larvæ come to the surface, leaving the central parts as fermentation develops and the temperature rises. On the following day a temperature of 70° C. to 90° C. may be found in the center of the heap.

The heat arising from fermentation in a manure heap may be used as a means of destroying the larvæ which it contains. The larva of the domestic fly, protected from the gases of fermentation, dies in three minutes when exposed to a temperature of 50° C. In contact with the gases it dies in one minute at 51° C., in five to seven seconds at 59° C., and four to five seconds at 60° C. When a manure heap is turned over the larvæ which come in contact with the hot parts in the interior are killed at once. A complete stirring up of the manure on the day after the deposition, and repeated on the two following days, causes a disappearance of ninety per cent of the larvæ. This operation is more easily and quickly done if, instead of waiting until the infected heap has itself produced the necessary temperature, it is exposed to the heat of a heap previously fermented. For this purpose, instead of placing the new manure on the surface of the heap, as is usually done, it should be buried in the hot parts by covering all its surfaces with a layer of hot manure twenty centimeters thick. In four or five hours the new manure may be considered as entirely free from eggs and larvæ, which would otherwise have developed in thousands.

This biological method of delarvization by heat is equivalent to the heating of the whole of the fresh manure to a temperature of 50° C. to 60° C., and is effected without apparatus and without fuel. It is within the reach of all, and only a simple training of the personnel is required. In practice, it is found that the mass of fermented manure required to furnish the necessary temperature is about eight times that of the fresh manure to be treated. Next day this may be used in its turn as a source of heat. The biothermic method of treating fresh manure can alone destroy quickly and cheaply the eggs and larvæ in a manure heap. The various methods of covering in manure heaps with materials such as earth, straw, etc., can only prevent the flies on the outside from depositing their eggs on the surface of the manure; they cannot hinder the development of the eggs which have been previously deposited on it in the stable. Now these furnish the greatest proportion of the larvæ, and from them, according to Roubaud's experiments, at least eight thousand to ten thousand flies originate.

CYSTINURIA AND CYSTIN STONES.

KRETSCHMER (*Urologic and Cutaneous Review,* January, 1916) refers to Wollaston's first case of cystin stone observed in a child aged five, and states that since the publication of the first paper in 1810 he has found reports of 107 cases of cystin stone, including the two cases he personally observed. These two cases were twin boys aged nine. The calculi were removed by litholapaxy. Other members of the family showed the presence of cystinuria. It has been long recognized that cystinuria does occur in families. In this particular family consisting of six members two had cystin stone, one showed the presence of a sulphur reaction, and the sixth was normal. When found the stones are practically always pure cystin.

Möorner has shown that cystin could be obtained by the hydrolysis of hair, and later Embden obtained it by the hydrolysis of serum and egg-albumen. The *x*-ray gives positive shadows. Treatment for cystinuria is unsatisfactory. The calculi should be removed.

THE RATIONALE OF CHEMOTHERAPY IN SYPHILIS.

McDONAGH (*Lancet*, Jan. 29, 1916), who claims to have shown that the spirochæta pallida is not the sole cause of syphilis, but only the adult male phase of a protozoön, believes he has demonstrated that the Wassermann reaction is a physical one dependent upon certain physical properties that syphilitic sera naturally possess, but which ordinary sera could easily be made to possess. It is not in any way a specific reaction.

Ehrlich held that a union takes place between salvarsan and the parasite with destructive action upon the latter. What the nature of the union is and why the death of the parasite should follow are not explained.

As a result of Ehrlich's statements, every one believes that the only active principle in salvarsan is the arsenic. McDonagh believes that the only action of the arsenic is catalytic—that is, that it accelerates an action going on spontaneously, but more slowly without its assistance. Mercury probably acts in the same way. The question naturally is asked as to why arsenic in salvarsan is more powerful than mercury, since the latter in ordinary circumstances is a more powerful antisyphilitic remedy.

A ratio exists between the intensity of action of a catalyzer and the degree of the colloid state in which the catalyzer is. In salvarsan the arsenic is in a colloidal state, hence its action would necessarily be greater than that of any mercurial compound which we are in the habit of using. The proof of what has been said can be found if we compare the action that different manganese compounds have on plant oxidases. Manganese formate, for instance, has nothing like such a powerful accelerating action upon plant oxidases as colloidal manganese hydroxide. The latter is colloidal and the former is not.

It will now be seen that the action of arsenic is somewhat analogous to that of complement in the Wassermann reaction, while the double benzene ring with its amino groups is analogous to the reagin or the antigen. The reaction between reagin and antigen is one of absorption, a reaction accelerated by the catalyst complement. The reaction between the syphilitic parasites, the lipoid-globulin molecules of the serum, and the amino groups of salvarsan is also one of absorption, a reaction accelerated by the complement present, allowing the arsenic to fulfil its action in increasing the amount of active oxygen. Not only does absorption take place between salvarsan and the phases of the leucocytozoön syphilidis, but also between the drug and the colloidal lipoid-globulin molecules of both the serum and the plasma cells. Therefore Ehrlich's statement that the drug is parasito-tropic only, and not organic-tropic, cannot hold good. For a drug to be parasito-tropic it must be organo-tropic. Indeed, its organo-tropic properties are more important, since most of the organisms are killed indirectly.

The fact that salvarsan can become attached to parasites, and yet not be fatal to them, is an observation in which there is a great deal wrapped up. The complement-fixation test, as applied to syphilis, in contradistinction to the true bacterial complement-fixation tests, depends not upon the molecules having homologous stereo-chemical molecular configurations, but solely upon their number and size.

The attachment of salvarsan to the syphilitic parasites, to the plasma cells, and to the lipoid-globulin molecules in the serum in a case of syphilis cannot possibly be due to a homologous stereo-chemical molecular configuration between the absorbed molecules, since, for one thing, salvarsan alone is an optically inactive body. The absorptive capacity as a whole appears to be greater in the case of a syphilitic serum than in the case of a serum from any bacterial disease, and it appears to be greater according to the stage of the disease.

As the lipoid-globulin molecules from a late case of syphilis are richer in carboxyl groups than those from an early case of syphilis, it follows that any substance they happen to absorb will tend to break down the molecules. The first action of breaking

down the lipoid-globulin molecules is to increase the area over which they can work; hence the reason why late syphilitic lesions disappear more quickly under treatment than do early ones.

Salvarsan becomes attached to the lipoid-globulin molecules of the syphilitic parasite, the plasma cells, and the serum by virtue of its ortho-amino groups and of the peculiar physical properties of protozoal lipoid-globulin. It attacks those phases of the leucocytozoön syphilidis in which reaction is most marked, especially the spirochætal phase, in virtue of its free hydroxyl groups directly, while its main action on the other phases is indirect. The arsenic presumably becomes converted into a hydroxide, in which form it acts as a peroxidase. The action of a peroxidase is to convert a peroxide into active oxygen. If active oxygen is formed in this way it is only natural to suppose that an analogous process exists to produce active hydrogen. In other words, the existence of an oxidase system necessitates the presence of a reducase system. All we know of a reducase system is that *in vitro* an extract of liver in the presence of an aldehyde will convert methylene blue into its leuco-base owing to the free hydrogen that is formed.

McDonagh has prepared a di-ortho-amino-thio-benzene, which he calls for short intramine. Although he believed himself the first to prepare this sulphur compound, he later found that B. Hofmann had prepared it in 1879 and in 1887 by oxidizing ortho-amino-phenyl-mercaptan with ferric chloride. K. Hofmann, the son of the former, in 1894 also prepared the same body by heating aniline with sulphur. Both father and son were working on the thio-anilines at the time, and neither prepared the substance for any therapeutic purpose. The same thing happened to Ehrlich, as the compound from which "606" was synthetized was isolated by Béchamp in 1863.

Intramine is a pale-yellow crystalline body, insoluble in water, but soluble in ether, alcohol, and acetone. It is best put up as an emulsion in olive oil, in which it is suitable for intramuscular administration. A lecithin absorption compound of intramine can be prepared for intravenous administration. Ehrlich found that the *dosis tolerata* of salvarsan for rabbits was 0.1 gramme per kilo. Therefore, when several times that amount of intramine can be injected into a rabbit weighing only 85 grammes it will be clear that intramine is an absolutely non-toxic substance. The biggest single dose the author has given to a human being is 12 grammes, without any untoward symptoms arising; 3 grammes can be injected every third day with impunity. When compared with salvarsan, he found that in the primary and generalization stages salvarsan was superior to intramine, but that in the recurrent stages the opposite was the case.

McDonagh, realizing that metals act as oxidizing agents and non-metals as reducing agents, tried other metallic compounds to see if they would take the place of the arsenical products. As a result he found that certain colloidal compounds of iron and aluminum—namely, their hydroxides, which he had converted into emulsoids with glycine, gelatin, or albumin—when injected intravenously acted tolerably well in early syphilis, and they also had the effect of increasing the action of intramine. Colloidal iron and aluminum compounds have a very great advantage over the arsenical drugs, as they are non-toxic, but to obtain an action equal to, or superior to, that of salvarsan it will be necessary to prepare more strongly absorbed compounds than the hydroxides. Such compounds he has been able to prepare, but the dosage and the best method of administering them have yet to be determined.

He has treated over 80 cases of syphilis with intramine, and the results, if salvarsan be given first and then intramine in early syphilis, and *vice versa* in late syphilis, are very much better than those obtained with salvarsan when it first came out. Several cases have healed at once with one injection, when they remained practically uninfluenced by an arsenic preparation and subsequent treatment with mercury and iodides.

ULCERS NEW AND OLD: JEJUNAL FOR DUODENAL ULCERS.

Under this title BLAND-SUTTON (*Lancet*, Feb. 19, 1916) writes in his customary vivid style. We know that chronic ulcer of the duodenum is a common lesion. For some undiscovered reason the ulcer in the majority of instances is situated within 2 cm. of the pylorus, and as a rule on the anterior wall of the duodenum, midway between its upper and lower borders. A chronic ulcer in this position is rarely accompanied by physical signs, but it sets up symptoms so easily recognized that there is no reason for resorting to the ways of Zadig in order to read them. The duodenal ulcer often appears as a rounded depression in the mucous membrane with the muscular coat as its floor. In many a layer of thickened peritoneum forms the base of the ulcer; occasionally it rests on the pancreas, the liver, or the gall-bladder. An ulcer on the anterior wall of the duodenum may rest on the peritoneum covering the anterior abdominal wall. There is a serpiginous ulcer that persists for years, creeping round the duodenum, scarring at one edge and so deeply eroding at the other that the tissues forming its base are often diaphanous. The peritoneal surface of the duodenal bulb in such a case is often white with scars. Obstruction of the pylorus frequently complicates ulcers near the pylorus; it is caused by edema of the mucosa. This condition also occurs with an ulcer situated in the pyloric antrum.

Some of the most troublesome ulcers in the pyloric region can neither be seen nor felt in the course of a gastrojejunostomy. A small duodenal ulcer can only be detected when it involves the peritoneum and produces a tell-tale scar. These small ulcers cause paroxysmal pain and digestive discomfort, the symptoms of a "vext duodenum and an agitated pylorus." This neat epigram (unearthed by Moynihan) was framed nearly a hundred years ago by Sydney Smith, the brilliant writer and preacher, who studied medicine in Edinburgh, and later in life doctored his parishioners as a rural amusement.

The chronic ulcer of the duodenum is exceptional in another feature. In all regions of the body open to observation a chronic ulcer is liable to become cancerous, especially between the thirtieth and fiftieth years; this is the age-incidence of duodenal ulcer. We know that chronic ulcers of the leg, lupus patches, and gastric ulcers occasionally become cancerous, but this change in duodenal ulcers has never been proved, although they are some of the most chronic occurring in man. The author says he has long sought among the living, the dead, and in museums for a duodenal ulcer that had become cancerous; so far his search had been unavailing. Cancer arises in the duodenum, but not in the region that is the usual seat of ulceration. The frequency with which gastric ulcers become cancerous and the infrequency of cancerous change in duodenal ulcers are difficult of explanation. When cancer exists in the stomach small fragments detached by the churning movements are transported with the chyme into the small intestine, but an implantation cancer in the intestine above the ileocecal valve is unknown. Shattock suggests that shed fragments of gastric cancer would not escape tryptic digestion. The author agrees with him.

The jejunal ulcer that follows gastrojejunostomy is often called a peptic ulcer, a term implying faith in the opinion that it is produced by the action of gastric juice. This ulcer was described by Braun in 1899. It resembles the common ulcers of the stomach and duodenum and it has sharp edges, often so sharp as to look as if it had been punched out. It is a dangerous ulcer and occasionally perforates before protective adhesions have formed, and causes septic peritonitis that often has a fatal ending. Some peptic ulcers have thickened edges and run a chronic course.

A peptic ulcer causes pain in the epigastrium aggravated by the ingestion of food. The symptoms often resemble so closely those associated with a duodenal ulcer as to lead patients to complain that the pain and discomfort, for which gastrojejunostomy was performed, have returned. When a

jejunal ulcer follows anterior gastrojejunostomy there is often an area of tenderness and sometimes a definite swelling under the upper part of the left rectus muscle. There are no valvulæ conniventes in the first 4 or 5 cm. of the duodenum, and its wall is thinner than in the remaining portion; it is often dilated and forms the bulbus duodeni. A remarkable transformation occurs in the jejunum when the escape of chyme from the stomach is transferred, in consequence of gastrojejunostomy, directly into the jejunum. The wall of the jejunum receiving the impact of chyme ejected through the new stoma becomes attenuated, the valvulæ disappear, and the jejunal walls assume the peculiarities of the supra-ampullary segment of the duodenum. This change entails a liability to ulceration so common in the duodenum. Thus surgery, by changing the environment of a segment of the jejunum, has evolved during this generation a new variety of ulcer. The time required to induce a segment of the jejunum to assume the characters of the supra-ampullary portion of the duodenum will probably be determined by subsequent observations.

It is the common opinion that the duodenal ulcer is caused by the impinging of acid chyme ejected through the pylorus on to the wall of the duodenum. The features surrounding the origin of a jejunal ulcer following gastrojejunostomy seem to support the percussion theory, but so far discussions on the mode of origin of gastric and duodenal ulcers pay but little regard to the influence of bacterial action. Most of us believe the stomach to be amicrobic as long as it can expel its contents, but observations on the fluid found in the abdominal cavity of patients with perforated gastric and duodenal ulcers prove that it often swarms with pathogenic microörganisms, especially streptococci. These are introduced with food, and especially milk, wittily described as "our most polluted article of diet."

It is noteworthy that a jejunal ulcer is rarely seen as a sequel to gastrojejunostomy performed for the relief of cancer of the stomach. This may be explained on the ground that such patients rarely survive the operation long enough to permit a jejunal ulcer to form. It is established that a "peptic jejunal ulcer" may make its appearance six months after a gastrojejunostomy, or be delayed ten years.

Some surgeons attribute these secondary ulcers to faults of technique, or a method of suture different from that employed by the surgeon who criticizes the report; or the suture fails to completely control the bleeding from the cut edges of the gastric or the jejunal mucous membrane and a hematoma forms. There is very little evidence available for the incrimination of silk or linen threads; persistent sutures have rarely been found associated with secondary jejunal ulcers.

With an unobstructed pylorus, gastrojejunostomy cannot be relied on to cure a chronic duodenal ulcer, and as it exposes patients to the discomforts and risks of regurgitant vomiting and jejunal ulcers the author has gradually abandoned it as a routine method, and prefers to excise the pylorus and the segment of duodenum containing the ulcer.

It is difficult to describe with certainty the functions of the pylorus. That it delays the efflux or chyme cannot be denied, but the rapidity with which a foreign body is discharged from the stomach into the intestine indicates that its controlling influence is by no means great. Smooth foreign bodies under an inch in diameter when swallowed are soon propelled through the pylorus. In the course of operations the normal pylorus when first exposed is usually firmly contracted. A few minutes later it dilates and, except for the vein that marks the boundary between the stomach and the duodenum, the pyloric sphincter is not easily seen. When the pylorus is excised it usually admits the index-finger easily, but after the parts have been immersed in preservative fluids such as a mixture of alcohol and water, or formalin solution, they contract and the orifice is quite small. The examination of museum preparations gives a false idea of the size of the pylorus and also of its function.

Duodenal ulcers may be mere dimples in the mucous membrane; others (miscalled fissures), deeply eroded pits, or narrow ulcers extending through the mucosa to the muscular tissue. It is conceivable that when irritated by the passage of acid chyme a spasm is set up producing painful sensations.

The common form of dilated stomach, nicknamed splashy stomach, and which was mainly responsible for bringing routine gastrojejunostomy into disrepute, is worth some attention; the author believes it is caused in some cases by spasmodic closure of the pylorus. Just as the small painful ulcer or fissure of the anus leads to irritative action of the anal sphincter, often ending in dilatation of the rectum and the pelvic colon, so repeated spasmodic contraction of the pyloric sphincter will produce dilatation of the stomach.

When the conditions are favorable, excision of the pylorus, to surgeons accustomed to intestinal operations, is a simple matter. Favorable conditions mean a narrow and elongated pyloric segment of the stomach and the absence of adhesions between the pylorus and the liver, or the pancreas, or the transverse colon. The disparity in thickness of the gastric and duodenal walls is embarrassing to the operator, but with practice the difficulty disappears. Extensive adhesions to the pancreas or to the liver are a bar to pylorectomy. The supra-ampullary segment of the duodenum is occasionally much shorter than usual, and makes the suture of the cut end of the stomach to the duodenum a difficult proceeding.

In the method the author employs the abdomen is opened by a median supra-umbilical incision. The parts in the neighborhood of the pylorus are examined in order to verify the diagnosis. The condition of the stomach is investigated, as well as that of the gall-bladder. When the conditions are favorable for pylorectomy the vessels are clamped and stripped from the pyloric region of the stomach, the loose tissue between the supra-ampullary portion of the duodenum and the pancreas carefully detached, and all bleeding vessels secured with forceps. When the pylorus is sufficiently freed from its attachments a clamp is applied to the stomach, about 5 cm. from the pylorus, the duodenum is clamped beyond the situation of the ulcer, and the pylorus excised. This is the best stage of the operation in which to ligature the vessels, as they are well exposed and easily accessible.

The cut edges of the duodenum and stomach are sutured in the manner of an end-to-end anastomosis. The author always uses thin sterilized silk for this purpose and for ligatures. It is tedious and unnecessary to describe in detail the methods available for sewing the cut end of the duodenum to the hole in the stomach. It is like stitching a sleeve in a shirt; the clever sempstress varies her methods according to the material and the size of the garment. So with the surgeon. In a case of extensive resection the line of suture in the stomach was 6 inches across. Not wishing to imperil the safety of such a long line of suturing by joining the duodenum to it, the writer implanted the cut margins of the duodenum into a fresh opening in the posterior wall of the stomach. In spite of the careful ligature of vessels there is usually some post-operative oozing from the tissues in the wound area, and it is wise to drain for forty-eight hours. The abdominal wound is closed with through-and-through sutures, the fascia being brought into apposition by intermediate sutures of thin silk.

The first patient Bland-Sutton subjected to pylorectomy for duodenal ulcer was a woman, aged thirty-five, at the Middlesex Hospital in 1909. Gastrojejunostomy had been performed three months previously, but the pain remained unrelieved. He excised the pylorus and the segment of the duodenum containing the ulcer. She made a quick and uneventful recovery. He has since lost sight of this patient. A few days later, when operating on a man for a duodenal ulcer, he found the conditions so favorable for pylorectomy that he excised the pylorus and the bulbus duodeni with the ulcer. Six years later he reëxamined him with the help of the *x*-rays and an opaque

meal, and found the gastric efflux satisfactory.

He has excised the pylorus for chronic duodenal ulcer according to the method described in 20 patients. In three of them he had previously performed gastrojejunostomy. In one the symptoms returned three months after the gastrojejunostomy, in another six years, and in a third two years. One patient, the sixteenth in the series, died. He was a man aged thirty-eight, transferred from Dr. Essex Wynter's ward to the author's with typical symptoms of chronic duodenal ulcer. At the operation an ulcer was found close to the pylorus on the anterior wall of a well-marked bulbus duodeni. The writer departed from his usual method and sewed the cut edges of the mucous membrane with catgut. The man made good progress until the fifth day, when his temperature rose to 103° F. He died on the nineteenth day after the operation. The suture line had sloughed in two spots. He attributed this unfavorable result to the use of catgut.

Since the treatment of duodenal ulcer passed into the province of surgery it has become the routine practice to perform gastrojejunostomy for its relief in the hope that by diverting the chyme through the new stoma into the jejunum the ulcer will heal. If the pylorus is obstructed by the ulcer the results are usually good, because the chyme must pass through the new stoma; but when the pylorus is patent the chyme flows through it and in some instances ignores the new route. The efflux can be watched with the help of an opaque meal and *x*-rays. The author believes it is better whenever practicable to excise the pylorus with the ulcerated portion of the duodenum on the principle of an end-to-end anastomosis. If this method could be made safe gastrojejunostomy for the relief of chronic duodenal ulcer with an unobstructed pylorus would soon be abandoned.

Experience proves that posterior gastrojejunostomy with an obstructed pylorus is a beneficent operation, in spite of the risk the patient runs of getting a new ulcer for an old one. The new ulcer has been evolved in this generation by alterations in the environment of the jejunum brought about by surgery.

WOUNDS IN WAR.

Bowlby (*Journal of the Royal Army Medical Corps,* February, 1916) after graphically describing the type of wound inflicted by modern weapons, discusses at some length the question of treatment, stating that we have the choice between the hypertonic salt solution of Sir Almroth Wright and the use of antiseptics, each of these having supporters. The object of each is the same in reality, for it is recognized by the advocates of both that it is necessary for dead tissue to be disintegrated or cut off as sloughs, and for granulation tissue to grow before healing can take place; and as one watches the blood-stained unhealthy discharge from the dead and dying tissues give place to the formation of pus by healthy granulations, one appreciates more clearly than ever before why the older surgeons spoke of "pus laudabile et bonum." They understood that when the velvety granulations and the creamy fluid appeared, destruction had ceased and repair had begun, and we recognize to-day, as they did, that there is such a thing as a relatively "healthy suppuration."

Bowlby thinks that those who prefer antiseptic to saline treatment have found that in war, as in all sloughing wounds and cellulitis of civil practice, nothing is so good as prolonged immersion in an antiseptic fluid; but unfortunately most of the wounds are not so situated that this is possible. When this is the case, then the next best thing is to employ constant irrigation, and very many wounds have done exceedingly well under this method, whether saline or antiseptic fluids have been used. But whatever fluid is employed, every surgeon knows by an experience which is far more valuable than any other source of information that good results in complicated wounds can only be obtained if the treatment of the wound is varied according to its conditions. It can only be ignorance of wounds that

would limit a surgeon to a single form of lotion, and it is the merest truism to say that in complicated and septic wounds a change of lotion or other application is as necessary as is a variation in the diet of the patient.

It has seemed that the period during which the saline hypertonic treatment is useful is strictly limited to the separation of sloughing and unhealthy tissue, and that once a granulating surface is obtained throughout it had better be abandoned, for it is generally painful, and if it is continued the skin becomes irritated, the granulations often become exuberant and flabby, and the healing process is correspondingly slow. The use of such well-tried applications as nitrate of silver and sulphate of zinc may well then prove more beneficial than that of the most potent solution of antiseptics or salines, for to treat wounds according to the daily report on their microbic infection, to the neglect of all else, is as foolish as it would be to treat every symptom of an illness rather than to treat the patient who is ill.

Within the past few months the treatment by solutions of hypochlorous acid has been most extensively tried, and the methods of producing it, advocated by Dakin and Carrel and Lorrain-Smith respectively, seem to most observers to be equally good. Personally, as far as the author has seen, there is nothing to choose between the two solutions, and he thinks that almost all surgeons are pleased with the results obtained in this treatment of wounds, and many have given up other methods in its favor. Where wounds of the hands and feet have been immersed in the solution they have cleared up with great rapidity, and where extensive lacerated wounds and bad compound fractures have been treated by irrigation, many patients have done extremely well. He thinks that wounds of this class have done better under treatment by hypochlorous acid than under any other, but they have not seemed to him to have become sterilized as rapidly as the cases recently described by Carrel, and he does not think that the good results he obtained were in wounds of the class he specially referred to—namely, extensive lacerations by shells and bad compound fractures. It was, however, his very decided opinion that the hypochlorous acid treatment was an important advance, and he found that it had to a great extent displaced other treatment in many of the casualty clearing stations. It is generally believed to have prevented the occurrence of gangrene in many bad lacerated wounds and to have arrested its progress in others; and, although he is well aware that it has not always been successful, he considers that it has already been productive of very much good, and that it is more useful in this class of wound than any other application he has yet tried. It is also a very remarkable fact that, unlike most antiseptics, it can be used in solutions sufficiently powerful to destroy virulent microbes very quickly without at the same time injuring the tissue cells. It should, however, be only used in solution, for if used as a powder it, like many other powders, is liable to form hard lumps which obstruct free drainage and so counteract its good effects.

SURGICAL TREATMENT OF GUNSHOT WOUNDS OF THE CHEST.

DAVIES (*Lancet,* Jan. 29, 1916) observes that the number of patients developing a hemothorax as the result of gunshot wounds of the chest is proportionately so large and our previous experience so small that this lesion becomes one of great interest. The blood in the pleural cavity in the patients who can be transferred to England is derived usually either from a vessel in the chest wall or from the lung; in some few cases a hemorrhagic effusion develops as the result of infection. It is rarely possible in the first two groups to recognize the source of the bleeding, and such being the case all patients must be treated as though the hemorrhage was pulmonary in origin.

The blood in the pleural cavity may be mainly fluid or consist of a massive clot; it may be complicated by the presence of gas or of a serous effusion or by infection.

Extensive clotting occurs chiefly in cases of shell or shrapnel wounds, either as the result of the extensive laceration of the tissues exposing the blood freely to the action of the tissue ferment and to broken fragments of rib, or from the introduction of portions of clothing. The clot is not free in the pleural cavity, but is attached, as a rule, firmly along one side, either around the broken fragments of a rib or at the point of entry of the shell fragment into the lung, where possibly some of the clothing has been detached from the metal; or to the diaphragm when the exit of the shell fragment is through that structure. *Per contra,* the blood in a hemothorax when caused by a penetrating bullet wound is mostly fluid. In the majority of these cases there is a deposit of fibrin, the amount varying in different patients. The fibrin accumulates mainly in the costovertebral sulcus and over the diaphragm.

Serous effusions develop most frequently as a complication of a hemothorax in which the blood is clotted and infected. Infection of a fluid hemothorax is as a general rule easy to diagnose; but the recognition of infection of a large clot, especially when complicated by a serous effusion, may be difficult. In many of these cases the source of infection is particles of clothing, and these form the center of the coagulum. Early and if necessary repeated exploratory puncture is essential to the successful treatment of these patients. Without it it is not possible to differentiate, in the majority of cases, between a simple pleural effusion, a hemorrhagic effusion, a fluid hemothorax, a clotted hemothorax, or at times an infected hemothorax. When done in the proper way there is no danger, no distress to the patient, and practically no discomfort. All that is needed is a good-class syringe, a small hypodermic needle, a second needle some 5 cm. in length with a correspondingly larger bore, and a small supply of novocaine. The infiltration of the tissues before introducing the larger needle into the chest is but a very slight complication of the procedure, while the effect, both mentally and physically, on the patients of the abolition of the pain from the stab through the pleura is very great indeed, and enables them to tolerate repeated explorations on the same or on a subsequent day with complete equanimity.

A small quantity of fluid blood in the pleural cavity may be rapidly absorbed; the lung resumes its normal relation to the chest wall and is unhampered in its movements. In such a case there is no need to interfere as the patient will recover completely. Larger quantities, a pint or more, must take longer to disappear; the rate of absorption varies greatly and may even be so slow that the processes of absorption appear to be arrested.

Even though the blood of a fluid hemothorax of moderate dimensions is after an interval of time apparently completely absorbed, and the lung reëxpanding comes into contact with the chest wall, the patient will not necessarily recover his former health and energy. One symptom, shortness of breath on exertion, will persist. This shortness of breath may develop and persist after the absorption and removal not only of a hemothorax, but also of a simple or tuberculous effusion or of gas, which has been present in the chest for some time. The symptom does not appear to have received the attention due to it, partially because the associated signs are few, and partially also because, the main cause of the trouble having been dealt with, the patient is freed of the chief causes of distress and has been able to resume light work. This shortness of breath is of the nature of a reflex condition dependent on the existence of an adverse ratio of the capacity for expansion of the chest wall and for expansion of the lung. Such a condition is particularly apt to occur when the lung, though able to expand, is hindered in the freedom of its movements by slight chronic thickening of the pleura, not necessarily universal over the surface of the organ. It would follow from this that in order to obtain the most successful results possible, it is necessary to adopt that form of treatment which will obviate to the greatest degree the organization of the deposited fibrin while

the lung is in a state of incomplete expansion; and there can be no doubt that the only treatment which is adequate is the early and complete removal of every considerable accumulation of fluid.

The fluid blood may be completely removed from the chest without discomfort to the patient, without the distressing symptoms of pain or cough, and without the danger of edema of the lungs, or recurrence of the hemorrhage, if the method which the author calls "oxygen replacement" is adopted. The essential of the method is that the intrapleural pressure, recorded continuously by a manometer, is under absolute control. The oxygen replaces the fluid as it is withdrawn and prevents the development of a high negative pressure, which is the cause of all the danger and distress. The apparatus consists of a glass container, with a capacity of about 25 Cc., having an opening top and bottom, and a third opening into the side low down. From a cylinder which is connected to the lower opening a stream of oxygen is allowed to flow through the container and escape at the upper opening. The lateral opening is connected by way of a filter to the needle which enters the patient's chest. Above the filter a three-way connection leads to the manometer; between this and the container is a tap which controls the admission of oxygen into the pleural cavity. As the aspiration proceeds and the manometer begins to register an increasing negative pressure, this control tap is opened and oxygen is sucked into the pleural cavity. The admission of oxygen can be regulated so that it corresponds exactly with the rate of aspiration of the fluid, maintaining a constant pressure. When all the fluid has been withdrawn the intrapleural pressure can be left equal to that of the atmosphere, or at any degree of negative pressure that may be desired.

After the withdrawal of the fluid there is in some cases a reaccumulation, serous in character; this may require a second or even a third aspiration with oxygen replacement. It will be found not only possible in so far as the patient's own comfort is concerned, but also advantageous, to leave a higher negative pressure than on the previous occasion, so as to exert greater traction on and consequently greater expansion of the lung. The production of such a negative pressure is, of course, permissible only when all danger of a recurrent hemorrhage has passed. The whole of the oxygen is absorbed within four days, becoming replaced in part by nitrogen and CO_2. When gas is present at the first or subsequent aspirations this should be replaced as well as the fluid by oxygen. The absorption of the oxygen is much more rapid than that of the other gases and helps therefore to maintain, and possibly in some cases to increase, the traction of the lung. This hastens the approximation of the visceral and parietal pleura, which is the surest way of preventing the reaccumulation of fluid.

Clotted but uninfected blood cannot be dealt with by this simple procedure. As it is necessary to remove the clot, an opening must be made through the chest wall. Adequate room can be obtained only by the subperiosteal resection of some 5 cm. of rib. The clot is detached and removed by some blunt instrument, and if there is no evidence to suggest infection the wound is closed. It is quite easy to stitch up the chest wall so as to prevent all leakage of air. The wound is sewn in layers, and the deepest stitches, which should be catgut, must include intercostal muscle, periosteum, and pleura; care being taken to avoid the nerve. At the end of the operation the pleural cavity contains air at atmospheric pressure; this is replaced by oxygen at a negative pressure equal to about 7 mm. of mercury. For this purpose the apparatus already described is used. The whole operation can be done under regional and local anesthesia if desired, and this is preferable to a general anesthetic if there is much displacement of the heart. As a general rule a serous effusion will accumulate in the ensuing forty-eight hours, and must be aspirated with oxygen replacement. There should be no risk of infecting a sterile pleural cavity by these operative procedures. The convalescence is much more

rapid and the recovery more complete than by the "wait and see" method.

A hemothorax which is infected must, as in the case of most empyemata, be treated by free drainage. The opening into the chest can be made through an intercostal space or through the posterior layer of periosteum after rib resection. The former method is most unsatisfactory. The interval between the ribs allows, in the majority of patients, of a small opening only, and it is consequently impossible adequately to explore the cavity or to remove clot or lymph when these are present, while the drainage-tube is too small to insure an unhindered escape of the pus and débris. There is danger, moreover, of wounding the intercostal artery when the incision is made—an accident which may not be immediately recognized—or of the tube later causing secondary ulceration into the vessels or necrosis of the rib by pressing on these structures. The operation of removing a segment of rib overcomes all these objections and takes only a very few moments longer. Both operations are equally practicable with local or regional anesthesia. The drainage-tube should be large; its inner end should project but a short distance beyond the parietal pleura and must not touch the diaphragm. Round the part which projects beyond the skin a strip of gauze moistened with some antiseptic should be placed to prevent a secondary infection of the track and of the empyema from the skin. For this same reason early removal of the drainage-tube is advantageous.

In those cases of hemothorax in which the blood forms a massive clot around an infected focus, but which are seen and diagnosed before the serum or secondary effusion has had time to become infected, the chest should be opened and the clot removed as described above. If after two or three days, however, the discharge has not become purulent, the drainage-tube can be removed and the wound allowed to close. After the wound is sealed up there will be a gradual collection of fluid in the pleural cavity, with generally some slight rise of temperature. This fluid must be aspirated with oxygen replacement and the aspiration repeated again later if necessary. The advantage of this method is that it diminishes the risks of secondary infection and of incomplete expansion of the lung, and therefore of chronic empyema and sinus formation.

Occasionally in cases of uncomplicated pneumothorax transferred to England; owing to some violent exertion in a patient recently injured, or even to some undetermined cause, the volume and pressure of the air increase after arrival. The rate of increase may be rapid and give rise to symptoms of acute distress requiring urgent interference, or it may be gradual. In the former type of case a valve-like opening is present; in the latter there is probably an area of damaged lung tissue which permits of a leakage of air at a rate slightly higher than that at which the gases can be absorbed from the pleural cavity. The damaged portions of lung heal in the course of time and the openings become obliterated, but in the meanwhile, if untreated, the increasing intrapleural pressure may become a source of great distress or even of actual danger to the patient, and must therefore be relieved. Rapid aspiration or the removal of sufficient gas to produce a negative pressure in the pleural cavity will reopen the pulmonary wound, and the relief thus obtained will be but temporary.

As an emergency measure, when the intrapleural pressure is endangering the life of the patient, a fine bore (0.5 mm.) hollow needle can be thrust into the pleural cavity; the intrapleural air under pressure will escape slowly, thus giving the patient great relief. If the symptoms are not so urgent, a needle connected with a manometer and with the outer air by way of a filter should be used; the needle is withdrawn when the inspiratory pressure reaches zero. The beneficial effects of this trifling procedure may be permanent in the mildest cases; it may last a few days or a few hours only. It is only in those cases in which a reaccumulation becomes serious after a matter of some hours that any other line of treatment

is indicated, viz., the establishment of a temporary fistula between the pleural cavity and the outer air. The most suitable instrument for this purpose is a hollow needle such as is used with the Record syringe, some 4 to 6 cm. long, according to the thickness of the chest wall, and 0.5 mm. in bore. This needle is driven through the chest wall, fixed *in situ,* and covered with a few layers of sterile gauze. The needle should be withdrawn at the end of twelve hours, but reinserted if necessary.

The acute pain, lasting often for a few days, due to a dry pleurisy, caused at times by the passage of a bullet through the chest wall, can be immediately relieved by separating the two pleural layers by gas. As the separation is required for a few days only, it matters little whether air or oxygen or nitrogen is used. Some 200 Cc. more than the quantity actually required to abolish the pain should be introduced so as to allow for absorption. Owing to the inflammatory condition of the parietal pleura it is more than ever necessary to anesthetize the track of the needle.

A CASE OF RESUSCITATION BY CARDIAC MASSAGE.

SICHELL (*British Medical Journal,* Feb. 5, 1916) reports the following case:

Private, aged twenty-two, was admitted on September 29, 1915, suffering from a severe gunshot wound of the left hand, received in France on September 26. A rifle bullet had struck the middle finger, almost completely severing it; the wound was very septic.

He was treated with hypertonic saline baths, and syringing with hydrogen peroxide, and the wound cleaned up considerably. As it was considered necessary to amputate the finger he was, on October 4, given a general anesthetic—a mixture of chloroform (two parts) with ether (three parts), and alternately pure ether on an open gauze mask. He was taking the anesthetic quite well, and was wheeled from the anesthetizing room into the operating theater.

He was lifted on to the operating table, when he suddenly became ghastly white, sweated profusely, and the pupils became widely dilated. Breathing continued slow and regular, but rather shallow. No pulse or cardiac impulse could be felt, or heart sounds heard. An incision a little to the left of the middle line was rapidly made into the upper part of the abdomen, and meanwhile hypodermic injections of strychnine and brandy were given, and a cloth wrung out of boiling water applied to the precordium.

The right hand was inserted into the abdomen, and a flabby mass, supposed to be the heart, seized through the diaphragm, and energetically squeezed. In a short time the flabby mass suddenly became hard—like a cricket ball—in the hand, and firm, regular, but slow contraction commenced. After a little these firm contractions became tremulous and threatened to cease, but on squeezing again became firm and regular; this routine was carried out several times, and at last a regular heart-beat and regular pulse were established. The patient began to strain and vomit, so that there was some difficulty in sewing up the abdominal wound. In about twenty minutes he was taken back to the ward, where a rectal saline injection was administered.

In the evening he suffered from considerable pain in the abdomen and chest, which was allayed by a hypodermic injection of morphine. He made a good recovery, and as it was deemed unwise to give him a further anesthetic the injured finger was eventually amputated by means of strangulation, with a piece of india-rubber tubing.

The man's general vitality was probably considerably lowered from septic absorption.

The movement of lifting him from the stretcher on to the table appears to have been the deciding factor in the cardiac failure.

The anesthetic was chiefly ether, the amount of chloroform being very small.

The subsequent pain was probably due to bruising of the diaphragm, and perhaps the heart.

Hypodermic injections of strychnine were of use once the heart's action was reëstablished, although obviously they could have been of no good whilst the circulation was stagnant.

UNILATERAL FUSED KIDNEY.

STEIN (*American Journal of Obstetrics and Diseases of Women and Children*, March, 1916) notes that the complete diagnosis of unilateral fused kidney includes the establishment of the existence of the fused organ, as well as its location, on the right or left side in the abdomen. The question may also arise as to the relative health and functional value of the fused organs, when the fusion is partial and incomplete. Flattened fused kidneys are especially liable to disease, as in Albarran's patient with pyo- and hydronephrosis of the upper half of the fused kidneys. Zuckerkandl also successfully resected the tuberculous lower segment of a long fused kidney.

Normally dystopic kidneys, and especially pathologically altered displaced kidneys, are very frequently mistaken for tumors of the internal genitals, including ovarian and uterine tumors, hydrosalpinx, pyosalpinx, and appendicitis. In other cases, dystopic kidneys have been suspected of being of intestinal, pancreatic, or mesenteric origin, or tumors derived from the bony pelvis. Erroneous diagnoses are sure to occur in some of the cases, which are apparently so simple that the possibilities of dystopic kidney are lost sight of. It is imperative, however, to include this condition in the range of diagnosis, especially as the modern functional tests and general methods of renal examination often permit the recognition of even difficult cases of dystopic kidney and also of fused kidney.

In a case reported by Huebschmann in 1908, the autopsy of a patient who had been treated for a long time unsuccessfully revealed the presence of a long fused kidney. The condition had been mistaken for a tumor of the liver.

The physical examination of the patient, including palpation and percussion, is of the greatest importance. In very stout or oversensitive individuals, or in patients with a deformed thorax, palpation naturally meets with difficulties. The discovery of a very large kidney on one side, which is not accounted for by a known pathological condition, and the non-discovery of the opposite kidney, is suggestive of a fused organ. It must be admitted, however, that palpation, in the majority of the cases, serves neither to establish the existence of a renal mass, nor the character of this mass as a fused kidney. Percussion of the abdominal region may help to determine the relations of the mass to the intestine, and its position behind or in front of the colon.

Having identified as kidney a hardened mass on one side of the abdomen, the examiner finds himself later on confronted with the still greater difficulty of recognizing a fused kidney. In the first place, it is necessary to exclude cancerous growths of the colon, which is relatively easy on account of the smooth, regular mass represented by the kidney; moreover, it is impossible to recognize intestinal tympanites above and below the mass. Cancer of the bowel is usually associated with hemorrhage and intestinal obstruction, and in the absence of definite functional signs can usually be excluded by means of radiography after injections of bismuth.

Movable liver or movable spleen is more apt to prove misleading. In women especially even a simple floating kidney and hepatoptosis are easily confused, and are often associated. A displaced liver is movable, and can always be raised to some degree; whereas a fused kidney is simply lowered, and usually fixed in its abnormal position.

In order to exclude a simple floating kidney, or a displaced organ, the presence of a kidney on the opposite side must be established. If a pathologically enlarged or hypertrophied kidney is found, it can be identified as a fused, double organ only through the most careful palpation of its contours. Following with the finger-tips successively the internal and external margins of the kidney, a series of inlets and

protuberances may be felt, representing the upper pole of the upper kidney, its hilum, its inferior pole, the groove which separates it from the lower kidney, and the corresponding portions of this kidney. While this may be possible in favorable cases of elongated fused kidney, the differentiation of a uniformly rounded fused kidney from a single kidney is naturally much more difficult.

Cystoscopy in suspected cases of unilateral fused kidney affords no information, on account of the invariably normal configuration of the trigone. The fused organ is always provided with two ureters, one for each kidney, and these ureters open normally into the bladder on either side of the trigone, whereas their entrance into the kidney is extremely variable. Catheterization of the ureters may prove serviceable and suggestive, for the pain felt by the patient when the capacity of the right and left renal pelvis is being tested will always be referred to the same side, no matter into which ureter the liquid is injected.

After the ureters have been rendered opaque by the injection of an impermeable liquid, such as collargol solution, or more simply, by the introduction of metal catheters, they may be examined radiographically. The diagnosis of unilateral fused kidney was made in this manner in Albarran's case, a woman fifty-four years of age. Both ureters were seen entirely on the right side; at a certain height, after leaving the bladder, the two catheters crossed and each stopped at a different level; in order to reach the renal pelvis, the lower catheter described an anteroposterior curve quite close to the kidney. Radiography is probably the only method which permits a certain diagnosis prior to operative intervention.

In the author's case the diagnosis was also established beyond doubt by means of this method.

Functional examination of the kidney according to modern methods may at least suggest, if not prove, the existence of unilateral fused kidney. Although the results of the tests, as practiced before all renal operations, are, of course, in themselves not sufficient for the diagnosis of a fused kidney, they are useful supplements to the findings of palpation, and especially of radiography, so that the total information in a given case points more or less conclusively to the existence of a fused kidney.

The diagnosis of unilateral fused kidney is often not made until the patient is on the operating-table. After its exposure a fused kidney is sometimes promptly recognized by its large size, its irregular form, and especially by the direction of the ureters, one ureter passing toward the opposite side of the abdomen. The arrangement of the renal blood-vessels is readily ascertained at the time of the operation.

Surgical operations for hydro- or pyonephrosis, stones, tuberculosis, etc., which enter into consideration in the treatment of unilateral fused kidney are: partial nephrectomy, pyelotomy, preferable to nephrotomy, decapsulation and nephropexy, and operations on the renal pelvis. The technique of partial nephrectomy must be modified to suit individual requirements. Nephrotomy is difficult for technical reasons, on account of the increased danger of hemorrhage, and is advantageously replaced by anterior pyelotomy. The usual operations, in cases of unilateral fused kidney, as not endangering the organ, are renal decapsulation and fixation (nephropexy). The remote results of these operative procedures are for the most part improvements rather than cures, especially as a successful fixation of the large and heavy fused organ is likely to meet with serious difficulties.

In case of a pelvic kidney, with a normal organ on the other side, extirpation may enter into consideration, the choice of the route (abdominal, sacral, perineal, or vaginal) being governed by individual requirements. The other method of liberating the pelvis from the obstructing kidney consists in laparotomy and displacement of the kidney into the large pelvis, followed by fixation.

The only possible method of clearing the pelvis from a displaced fused kidney in obstetrical cases consists in the transference

of the kidney into the large pelvis and fixation in its new position, after laparotomy. Expectant treatment is more advisable, however, in view of the risk of interrupting the pregnancy, as the intervention involves considerable dragging upon the uterus in order to provide free access to the kidney. In a general way, it is probably safest to induce premature labor at the proper time, or to perform Cæsarian section, when the child is living and the birth passages are greatly narrowed. Halban suggests that this might be followed at once by the transference and fixation of the kidney above the linea innominata.

RADIUM.

Moriarta (*Medical Record,* March 4, 1916) considers radium a force and not a therapeutic measure. The three kinds of rays, to which the names alpha, beta, and gamma have been given, have well-defined characteristics and differences. Technically speaking, alpha rays are not rays at all, but are positively charged atoms of helium, with a weight four times that of an atom of hydrogen. They are liberated with an explosive force, and travel 12,000 miles a second. The energy of their liberation accounts largely for the heat of radium, and the force of their bombardment for the injuries to the tissues, such as superficial irritation, as well as burns of varying degree.

The beta rays are also not rays at all, but a negatively charged stream of electrons.

The gamma rays are not particulate matter, but a vibration of ether, similar to ordinary light. They do not polarize, pass straight by a magnet, and are not deflected by a prism.

In the use of radium externally it is necessary that the rays should be filtered to avoid superficial irritation and burns. By this we mean simply that the passage of certain rays must be obstructed by the interposition of some material or space that will absorb or stop the rays that are developed which we do not want to use. Alpha rays, being particles all traveling the same distance at the same time, are stopped by a slight obstacle, such as a sheet of paper. Beta rays show different degrees of penetration, being divided into soft, medium, and hard.

If one makes space the filter for these various rays, alpha rays are cut off by a distance equal to 3 cm. of air; beta rays, by about three times that amount; while gamma rays would reach a distance of 100 meters and still affect the electroscope, or travel 3 meters, penetrate a man, and cause a fluorescence beyond him. The ratio of penetration of these rays may be expressed by 1:100:10,000.

For the alpha and soft beta rays, one may make simple filters of lead, paper, rubber, or mica. Metals, however, furnish the common filters for the medium and hard beta and gamma rays; silver, aluminum, lead, brass, and more recently gold and platinum, are employed. One centimeter of lead screens the hard beta rays completely; gamma rays need 5 cm. of lead for what is practically complete absorption, although a small fraction will still be left with 10 cm. We thus vary the quality of the rays by filtration. Without filtration, there are 90 alpha particles to nine beta and one gamma ray. Under strong filtration, 600,000 total rays are reduced to 5000 (gamma) rays.

Mention should be made of still another class of rays which are created when a filter of lead is used in the application of radium: they are called secondary rays, are very irritating, and can be screened by rubber tissue of varying thicknesses.

After the nature of the rays and the kind and amount of filtration have been determined, the third factor in radiation is the density of the tissue to be radiated. A knowledge of all three facts is essential in practice; in fact, they absolutely control and determine the results of radium treatment when it is used externally, and when these factors are not well understood it is easy to account for the failures and disappointments in its external use.

In considering the use of radium, we will find that the alpha rays must in the main

be rejected therapeutically. Their discharge has been called "the most intense liberation of power in nature." Kinetic energy is their chief characteristic. As has been said, they account for the heat of radium, their chemical energy is shown in catalysis, and the rays are irritating and destructive to normal tissue. Soft beta rays are in much the same category; but the hardest beta rays, which are much more penetrating, are similar in effect on pathological tissue to gamma rays. In gamma rays, it is agreed, we have the most useful therapeutic agent of radium, as they will penetrate a great distance, though, as we have said, their number is relatively small. Our problem is to get the greatest amount of these rays in any given place. This will depend upon the intensity (amount of radium used), the manner of filtration, and the period or time of exposure. The intensity of an application is greatly augmented by what is termed "cross-firing;" this is simply the focusing of the gamma rays from several sources upon a given district; the burying of a tube will also increase its efficiency many times, because all the rays will thus become engaged, while if it lies upon the surface this is not the case, as only the rays emitted in the direction of the object can be effectual.

Gamma rays are shown to have a predilection for pathological cells, in proportion to their youth, embryonic state, or degree of development; the quantity of radium employed should be at least sufficient to affect the normal tissue. Young connective tissue, in the vicinity of the application, may be observed multiplying and developing vigorously. This is the essence of the favorable action of radium on morbid tissue: normal tissue elements are stimulated, while morbid ones wither and are gone. All observers have seen the wonderful power of radium to destroy growths of a simple and intermediate nature, from warts to non-infiltrating carcinoma. Large cell growths are simply "blown to pieces." New growths differ considerably as to their degree of resistance. Epitheliomata require larger doses than some other morphological tissue. The nearer the surface of the body the new growths are, the easier can they be destroyed, whether benign or malignant. Growths of the mucous membrane of the mouth require large doses and are quite difficult to cure. The effect of radium extends only to the depth of a fraction over an inch; therefore, a large mass to be attacked successfully must be carefully plotted with extensive direct radiation. If possible, a tube of radium should be placed in the tumor mass for a cross-fire. Applicators in the form of needles are here useful. The results of treatment may be complicated by an erythema, or even a severe burning, and by extensive edema. This is usually due to ineffective screening, or too long an application, where a large dose seems imperative. Toxemia from absorption, following prolonged treatment where there is no drainage, must be borne in mind.

Burns *per se* are not material if the desired result has been accomplished at the time they occur. They are ordinarily superficial, not very painful, and heal slowly. But if the further local application of this particular field is to be continued, then the early irritation or congestion must be recognized and radium application be discontinued for a time, otherwise sensitization of the skin will result and further treatment must be delayed indefinitely.

The physiological action of radium sounds not unlike a fairy tale. It often increases the red blood count one-fourth of a million in a short time. It stimulates all cell life, particularly that of the enzymes, thus aiding and improving metabolism. It increases the elimination of carbon dioxide, urea, and uric acid, and in addition is said to keep the latter in solution in the blood. It diminishes the viscosity of the blood and greatly increases the quantity of urine secreted. It stimulates and increases the appetite, and aids digestion by activating the digestive ferments. It dilates the blood-vessels, through the excitation of the vasomotor nerves. Its action in anemia is little short of marvelous, it relieves the pain and local manifestations of gout promptly, and also the pains of neuritis. It lowers blood-

pressure almost so surely as you administer it. It is a prompt and powerful tonic and stimulant. In larger doses it often produces a decided reaction, causing headache, nausea, lassitude, and general body discomfort. The cases in which this reaction occurs are thought surely to receive benefit from its use. No toxic or lasting ill effects have been reported.

The author records a variety of cases all extraordinarily benefited. High blood-pressure is controlled to a marked degree by internal administration. Arthritis deformans is reported as cured. Eight prolonged cases of myalgia or neuritis were cured by a single intravenous injection. Seven cases of nephritis with albumin, casts, headache, and shortness of breath also received complete relief. Gout also yielded to emanation treatment, whilst the results in local application of radium in malignant and benign growths were startling.

THE PRESENT STATUS OF GALL-STONE DIAGNOSIS BY THE ROENTGEN RAY.

O'Brien (*Boston Medical and Surgical Journal,* March, 1916) calls attention to a period when it was universally regarded as impossible to take gall-stones by the *x*-ray, and traces the gradual development of improvements until the publication of Cole and George's paper in 1915, who state that they can show gall-stones in all cases in which they are really present, and that a positive diagnosis can really be made in such a large percentage of cases in which gall-stones are present that the negative diagnosis has become far more important than it was previously considered to be.

In a later communication George insisted that success was only a matter of proper technique. In a series of 54 selected cases reported by him, which were operated upon by eight different persons, a positive diagnosis was made in 30 cases and a negative one in 24. There were three errors in positive diagnosis. No case negatively diagnosed was found to have gall-stones at operation. That the negative diagnosis was 100 per cent correct is exceedingly significant of the recent advance that has been made in the Roentgen diagnosis of gall-stones.

For preparation he believes catharsis valuable, and prefers an effervescing saline. The gas may very materially improve the definition of calculi. The patient should be fasting. Catharsis by mouth can be aided by an enema, so that if artificial gas distention of the stomach or colon be necessary, it may be performed profitably. A full bowel may at times be an advantage, as when bismuth filled, since it has a tendency to immobilize the gall-bladder.

Roentgenoscopy has absolutely no place in the direct diagnosis of gall-stones. Serial plates alone should be employed. The patient should first be examined prone, the abdomen on the plate with the shoulders slightly raised, if the patient be stout. Several of the plates should be taken with the patient in this position, and the patient may bend sharply to the left, directing the rays obliquely through the liver, using, if one wishes, the 8-by-10 piece of board as described by Pfahler to bring the gall-bladder closer to the plate, or the circular plate-holder of Cole, which can be pushed up under the gall-bladder for the same purpose. Such procedures are seldom needful. A fine-grained intensified screen is used. It is fundamental the patient should not breathe during the exposure. It is essential that one work with a soft tube that will stand up under repeated charges of heavy voltage. Usually the tube is in a plane parallel to that of the patient's body. A small diaphragm and a small cone are very important factors aiding one's success in looking for gall-stones. The plates should be read only when thoroughly dry. Direct illumination by the northern sky is often particularly helpful. Nearly all gall-stones contain a good deal of cholesterin, and calcium salts of the bile pigments may be said to be invariably present.

The more lime salts present in a calculus, then the more readily it shows up on the roentgenogram. There is usually a peripheral shadow, a so-called ring-formed shadow.

REVIEWS.

BLOOD-PRESSURE: ITS CLINICAL APPLICATIONS. By George William Norris, A.B., M.D. Second Edition, Revised and Enlarged. Illustrated. Lea & Febiger, Philadelphia, 1916. Price $3.00.

The subject of blood-pressure has been during the last ten years an exceedingly interesting source of medical information and our views concerning it have had to be modified from time to time. Possibly the most noticeable modification is a recognition of the fact that in most instances an estimation of the diastolic pressure is of greater importance than an estimation of the systolic pressure. Another important point has been the study of high blood-pressures in relation to the possible duration of life; and still another, the different pressures found in the various forms of valvular cardiac disease, with or without ruptured compensation.

When the first edition of Dr. Norris's book appeared two years ago there was a definite need for a contribution of this kind, and this need was, to a large extent, met by the text which he prepared. Taking it all in all, we think it is fair to state that the summarization of the scientific side of the subject is of greater value than the summarization of the clinical side.

An examination of the text of the volume shows that he and those whom he has associated with him are well informed in regard to the physiology of the circulation and the many forms of apparatus which have been devised for its study.

Concerning the matter of blood-pressure in the prognosis and treatment in pneumonia, Dr. Norris believes that Gibson's rule is by no means infallible, a conclusion which any one of considerable experience also must have reached. We are inclined to believe that careful study of the diastolic pressure in pneumonia will be of more value for the purpose just named than the systolic pressure, but, so far as we know, no considerable number of records of the diastolic pressure of pneumonia have been published. We do not believe that the experiments of Porter and Newburgh upon rabbits suffering from pneumococcic septicemia can be taken as conclusive in respect to the question of blood-pressure in pneumonia in human beings. Sufficient emphasis is not laid upon the persistence of sound in the brachial artery in auscultation in respect to aortic regurgitation, and our experience leads us to differ from the author in stating that this phenomenon is suggestive but not pathognomonic of aortic regurgitation.

Taking it all in all the book is an excellent one. We hope in the next edition that the author's personal experience will be more firmly impressed upon the text and that he will more frequently criticize or indorse the quotations which he makes from other authors. An illustration of the lack of personal criticism is to be found in the quotation as to the chief contraindications to the use of nitroglycerin, in which the somewhat surprising conclusion is arrived at that chronic nephritis with a very high blood-pressure and toxemia, as a rule, stands in the way of the use of this drug. This is certainly not the opinion of the great majority of medical men and should either be supported by some definite statement as to its accuracy, or else be accepted with an expression of reasonable doubt.

In the next edition, too, some attention should be paid to the index, which, at present, is lacking. Thus there is no reference under auscultation to the auscultatory method of estimating blood-pressure, nor is this method referred to under the name of Korotkoff; nor, again, does the word "phase" refer one to the text where he will find a description of the variation in sounds which take place in a vessel at points below systolic pressure.

THE MORTALITY FROM CANCER THROUGHOUT THE WORLD. By Frederick L. Hoffman, LL.D. The Prudential Press, Newark, 1915.

This exhaustive volume is dedicated to the American Society for the Control of Cancer, and to the American Association for Cancer Research. Its preparation was

instigated by reason of the fact that the author is statistician to the Prudential Insurance Company, and insurance companies are naturally greatly interested in a disease which is so common and which has so high a mortality. There are nine chapters and a considerable number of charts. The first chapter deals with the Statistical Method in Medicine; the second with the Statistical Basis of Cancer Research; the third with the Increase in Cancer; the fourth with Mortality from Cancer in Different Occupations; the fifth with Cancer as a Problem in Life Insurance Medicine; the sixth with Its Geographical Incidence Throughout the World; the seventh with Statistical Data of Cancer Frequency in American States and Cities; the eighth, Statistical Data of its Frequency in Foreign Countries. The ninth chapter deals with Some General Observations and Conclusions on the Cancer Problem. Thirteen of the charts show cancer mortality in various States and countries and also in the experience of the Prudential Company. The book is closely printed and provides an amount of information in regard to this important subject which cannot be appreciated until it is carefully examined. The author deserves the greatest credit for his exhaustive study of an important question of interest to all human beings.

THE PRINCIPLES AND PRACTICE OF PERIMETRY. By Luther C. Peter, A.M., M.D., F.A.C.S. Illustrated with 119 Engravings. Lea & Febiger, Philadelphia and New York, 1916.

The need of a book on the principles and practice of perimetry in the English language, long felt by students in ophthalmology, is supplied by Dr. Peter's excellent monograph. The author, as he states, has not endeavored to write an exhaustive treatise; he desires to furnish the student with a useful handbook, where he may find the chief applications of perimetry and the usual methods of employing various types of perimeters, and where he may acquire the necessary information to interpret the results. He has succeeded in these efforts. Doubtless in future editions the author will more fully analyze the results of modern perimetric investigation, to some of which he refers—for example, Rönne's work and his elaboration of the Bjerrum method, quantitative perimetry, and the reinvestigation of the fields in functional nervous diseases. As it is, Dr. Peter has very satisfactorily covered the ground, and his work is cordially commended. Of especial value is a very full bibliography, where the articles quoted are carefully classified, and many titles are inserted for those who desire to pursue this subject more fully.

G. E. DE S.

TOBACCO HABIT EASILY CONQUERED. How to Do It Agreeably and Without Drugs. By M. MacLevy. The Albro Society, New York, 1916.

We are not quite sure whether it is appropriate to notice this book in the columns of the GAZETTE. It is evidently written by one who does not approach his subject in a judicial frame of mind, but, for some reason, is inspired to attack the use of tobacco in a fanatical fashion. One portion of the book has chapters, or sections, bearing titles such as follow: Tobacco Causes Insanity, Tobacco Causes Cancer, Tobacco Causes Heart Failure, Epilepsy, Paralysis, Genital Weakness, and Apoplexy. The author does not bear a medical degree, but he has written other books, "Back to Life" and "The MacLevy System of Dumb-bell Training." As with most writers of this type, he quotes from various contributors to medical literature only those parts of what they have said or written which support his view, and without a sufficiently exhaustive statement of their opinions to convey the correct idea.

THE ART OF ANÆSTHESIA. By Paluel J. Flagg, M.D. Illustrated. J. B. Lippincott Company, Philadelphia, 1916. Price $3.50.

The title of this book is an interesting one in that it emphasizes that in the administration of a surgical anesthetic art, as well as scientific knowledge, is essential. The author is imbued with the correct idea that, as familiarity is prone to breed contempt, the anesthetist should never forget to approach each case with a certain degree of courtesy and respect, since the possibilities of success or failure are almost unlimited. In the preparation of his text the author has endeavored to present the subject in such a way as to be instructive to the

student, the interne, and the general practitioner. He gives a history of anesthesia, a classification of the stages of anesthesia, discusses the anesthetics commonly employed, and, in an important chapter, deals with the newer methods of medication preliminary to anesthesia. Altogether the book covers a little over three hundred pages, which is printed in large type of wide leading and, for this reason, is unduly bulky.

The author believes that in the light of present-day pathology chloroform should cease to be used as an anesthetic in obstetrics. He also thinks that it is well to combine it with ether. He strongly advocates its administration from a freshly opened container and in the prone position, and ends with the statement that the mortality is from one in one thousand to one in three thousand. We believe that the one in one thousand is far too high. This chapter on chloroform is, considering its importance, we think, distinctly disappointing. A very large number of illustrations are introduced to show various forms of apparatus, and these in some instances are more valuable than the text.

CORRESPONDENCE.

LONDON LETTER.

BY J. CHARLTON BRISCOE, M.D.

These troublesome times have seen the discontinuance of such spectacles as football and cricket. Usually there is one of the final cup ties at football held either on the Saturday before Easter Sunday or on the following Monday. This year no such competition took place, and no crowd was therefore congregated at the football grounds. Our people, however, have found some other form of relaxation. Boxing displays still continue, and the Ring, situated in South London, is still patronized by those who remain. Beyond Barking there is a trotting ground which was never favored prior to the war, but since flat racing has been largely discontinued and the steeplechase season is over, these trotting matches are proving a great attraction. On Monday trains to Barking were crowded, and as the track is some little distance from the station, the taxicabs, which had accumulated in large numbers, were very busy transporting visitors to the contests. The local police were evidently looking the other way, for many taxicabs contained six or eight people going off in this direction. This is one of the few outlets left open to the betting fraternity, and these meetings, which were formerly neglected, have now turned out very successfully.

There was a queue at least 150 yards long waiting for admission to Madame Tussaud's. Large crowds were also to be seen on walking expeditions, some as far as Richmond and Uxbridge, whereas others were patronizing the open spaces in various parts of London, of which there are a large number. One of these is situated in North Hampstead, and is of special interest to medical men, in that it was the original country residence of Sir Spencer Wells, and contains a large Elizabethan house and about 80 acres of land adjoining. On his death the property was sold, and bought by public subscription for the public use. During the winter it was used as a headquarters of an artillery brigade, which was raised in Hampstead, and the ground very naturally shows traces of this occupation. It had evidently been a property of some standing, and was well wooded. The trees, however, were suffering from senility, and the recent gale had played considerable havoc with the elm trees, about twenty of which had measured their length on the ground. Some red deer are kept in an enclosure, and in another part of the grounds is a lake inhabited by a number of water-fowl, amongst which are two swans, which are called the "persevering swans," owing to the fact that last year they laid three sets of eggs and eventually hatched out one cygnet. On Saturday the park was fairly full, and khaki was by no means absent.

Passing through the outskirts of London on the bank holiday reveals the fact that there is still a very large number of young men who are not in khaki. This was particularly noticeable in the Whitechapel area and in the south of London in the neighborhood of Wandsworth and Camberwell. The majority of these had no badge indicating that they were war workers. It is explained that numbers of these young men are missed from their recruiting classes owing to the fact that they are lodgers and can move from one address to another without leaving any trace of their movements. No doubt some means will ultimately be found for tracing them, and an attempt is now being made by the new order that people liable to military service must produce their registration card, issued in August, 1915, on demand by certain authorized persons. It is quite obvious that numbers of these can certainly not be classed as physically unfit, and they will no doubt in time be brought to book.

I have in former letters commented on the occupations which have been taken up by women to replace men. It is more and more noticeable in connection with the railway systems, and again with the tram and bus services. In none of these occupations are the women acting as drivers, though many may be seen on delivery vans and driving light motor cars or wagons. They seem to be able to stand the railway work, such as ticket collecting and issuing, very well, but I learn that the majority are unable to persist for any length of time as conductors of buses, and that at the end of a month or six weeks they are obliged to give this up owing to the life being too strenuous. Nominally bus conductors have a rest at the end of each journey, when they are supposed to be able to get food and something in the shape of a cup of cocoa. Actually, however, owing to delays on the route and having to start off punctually on the next journey, the time is too short to allow for any definite rest, so that the rest periods are hypothetical, and the good results do not actually accrue. This is unfortunate, as the women conductors have already won golden opinions owing to their politeness and the efficiency of their work. It will be interesting to see in the future what other occupations turn out to be too strenuous for this form of labor.

So far as can be gathered without official knowledge, the tendency of the Medical Department of the War Office is to gather as many cases as possible into restricted areas. As a result of this a number of the smaller voluntary hospitals are being closed down, having served their purpose as stopgaps during the preparation of the larger bases. Truly medical cases are fewer than formerly, and have recently been generally of the type of rheumatism following exposure. During the past winter there has not been nearly so much frost-bite as during 1914-15, and the cases have been very much milder than during that period. On the other hand the functional element is rather marked. These cases recover very rapidly. There seems to be a general current opinion amongst the men that having been out in Flanders they have done their bit and ought to be allowed an easy time, while those who have not been out should be sent to replace them. This was well expressed to me by one man who had a functional gait, and who I had been encouraging to walk properly, in the words, "I see, sir, you are determined to send me out again."

A renewal of the suggestion of organizing small voluntary units for emergency work in this country has been made, more especially on behalf of the navy. Such units would consist of a surgeon, anesthetist, and two or three assistants with special knowledge of different branches of the subject, such as ophthalmology, medical work, or pathology, who will be liable to be called to any part at a moment's notice. The idea is to establish a form of clearing station to treat the cases immediately they are brought out of action. This has always appeared to be a rational method of organization, but hitherto has not been regarded with favor by the authorities, who insist on having permanent control of the individual and of his whole time.